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ANNALES D'OCULISTIQUE

Founded by FLORENT CUNIER and continued by WARLOMONT

EDITED, PARIS,
BY

Dr. E. VALUDE

De la Clinique Nationale Ophthalmologique des Quinze-Vingts.

(French Edition)

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NEW YORK

BY

Dr. GEORGE T. STEVENS

(English Edition)

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A NOS LECTEURS.

Nous sommes heureux d'avoir une bonne nouvelle à annoncer à nos collaborateurs et à nos lecteurs.

A compter du premier Janvier de cette année, une Edition anglaise DES ANNALES D'OCULISTIQUE, reproduction exacte de notre édition de Paris, sera publié à New York sous la direction du Dr. George T. Stevens.

Mais puisqu'il s'agit ici d'une transformation qui est nécessitée par le succès croissant des Annales, il est juste et il nous est agréable d'en remercier avant tout nos collaborateurs et nos correspondants puisque c'est grâce à leur travaux et leur concours zélé que le Journal a pu acquérir un tel développement. Le Dr. Stevens trouvera ainsi un terrain tout préparé et des moyens d'action qui lui assurent la réussite dans les efforts qu'il fait en faveur de l'œuvre commune. Les Annales, d'autre part, ne peuvent que se féliciter de la collaboration, que Monsieur Stevens et ses amis leur apporteront.

Et c'est d'ailleurs par ce dédoublement des Annales d'Oculistique en deux éditions de langue différente, mieux que par des paroles, que nous pourrons remercier nos excellents collaborateurs. Nous pensons, en effet, que ils se réjouiront comme nous-mêmes, de voir leurs idées et leur travaux confiés à une publication si efficace.

Chacun des fascicules mensuels des Annales d'Oculistique paraîtra à peu près en même temps à Paris et à New York. Nous rappelons à cette occasion que toute communication relative à la rédaction de l'une quelconque des deux éditions peut être faite soit au Dr. Valude, 198 Boulevard Saint Germain, Paris, soit au Dr. Sulzer, 7 Quai du Mont Blanc, Genève, soit au Dr. Stevens, 33 West 33d Street, New York.

Nous profitons en outre de la circonstance pour rappeler à tous ceux qui nous font ou voudront nous faire l'honneur de leur collaboration que, pour donner toute facilité aux auteurs auxquels la langue française est peu familière, un service spécial de traductions est attaché à notre journal. Des travaux peuvent nous être adressés en Anglaise, Allemand, Italien, Espagnol, Hollandais, Russe, et en Danois.

SULZER.
VALUDE.

ANNOUNCEMENT

From the time when, in 1838, the leader in ophtbalmological thought, Cunier, founded the Annales d'Oculistique as the pioneer in ophtbalmological journalism to the day when he closed his life work with his hand upon its proof-sheets, the fame of the journal which he had established as a forlorn hope, as well as its beneficent influence in elevating the specialty of ophtbalmology had extended, year by year, until it had reached all civilized lands.

During the many succeeding years of its success under the direction of Warlomont, the Annales attained to a still greater influence. In all its fifty-seven years of existence Annales d'Oculistique has maintained its position as a leader in ophtbalmological thought and as a most complete record of the grand progress of the science.

Distinguished for its enterprise, its dignity, and its independence, it has held a foremost rank in all countries where ophtbalmology has been studied.

Of those who have served upon its staff as regular collaborators, it is sufficient to recall from the long list of distinguished names, those of Sir James Bowman, Ed. Jaeger, Sichel, Giraud-Teulon, Lawrence, Mackenzie, Crittchet and Desmarres, while such illustrious teachers as Von Graefe, Donders, and scores of others who have lent the greatest impulse to the progress of ophtbalmology, have employed its pages to record their studies and their experiences.

Since the death of Warlomont and the assumption of the control of the journal by the present management greater progress than ever has been made, and it is safe to say that no more complete resume of American ophthalmological literature exists than is to be found in its pages.

It has long been the wish of the directors to make the journal in every respect an international medium of communication between all who are interested in the study of its branch of science.

With the present number the member of the staff who has for the past four years acted as the American collaborator assumes the direction of an edition to be published in English.

The two editions will be entirely uniform, all articles appearing in one edition appearing also in the other.

In future issues original communications from American and English writers will constitute a much more prominent feature in the pages of the journal than they have in the past.

The aim of the directors, on both sides of the Atlantic, will be not only to maintain the distinguished place which the journal has always occupied in ophthalmological literature, but to advance its usefulness with the progress of the science.

The journal will be, as it has always been, free from personal bias, serving only the cause of scientific truth.

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CONDITIONS OF PUBLICATION AND OF SUBSCRIPTION

The *Annales d'Oculistique* commences its fifty-eighth year as an actual international periodical, being published simultaneously and uniformly each month in the French and English languages. Each number contains from 64 to 80 pages, forming annually two volumes of about 1,000 pages.

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All articles appearing in one edition will appear also in the other. The advantages of this arrangement will be apparent to authors.

ANNALES D'OCULISTIQUE

Volume CXIII.—Number 1.

JANUARY, 1895.

I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

OPTIC NEURITIS CONSECUTIVE TO OZÆNA

By Dr. D. E. SULZER

Little by little, recent publications have reduced the group, formerly quite respectable, of rheumatic and idiopathic varieties of optic neuritis.

While that group holds a conspicuous place in the Handbook of Graefe and Sæmish, published in 1877, we look for it in vain in the most recent of the great treatises on ophthalmology, that of Panas. The greater number of cases of optic neuritis have now been ascribed to general affections or to intoxicants.

In this discussion I shall pass by the optic neuritis which is characteristic of locomotor ataxia, that of multiple sclerosis, the forms consecutive to different affections of the encephalon and its envelopes, and traumatism of these parts, as well as those affections of the optic nerve associated with acute infectious diseases and their complications, among which at present the grippe holds the place of honor, in order to give attention to blennorrhagic optic neuritis. Although still but little known, this ranks with the blennorrhagic sciaticas and myelites first described at the commencement of the present century by Everard

Home, and in 1856 by Stanley; blennorrhagic localizations, to which Pidoux added, still later, purulent spinal meningitis, and Ricord, blennorrhagic hemiplegia and paraplegia. Since then observations of blennorrhagic metastases have become familiar, and the results of bacteriological examination have, of late, repeatedly shown the complex nature of the infections which enter through the urethra. Through this open door pass the white staphylococcus and the streptococcus associated with the gonococcus, with the result of an invasion of the urethral epithelium.

We owe the first observation of blennorrhagic optic neuritis to Panas, an observation found in his treatise. A person twenty-nine years of age, in good health, in 1889 became subject to a second urethral blennorrhagia, complicated with sciatica, which obliged him to keep his bed for three months. Twelve days after the onset of the disease he suddenly lost the vision of the right side, as a result of a chill coming on during convalescence.

The ophthalmoscope showed the existence of a "papillo-neuritis."

In connection with blennorrhagic neuritis should be mentioned inflammations of the optic nerve of uterine origin. Long admitted and recognized as results of infectious puerperal conditions, they are much less known in connection with non-puerperal uterine affections. In this last category we should place a large part of an extended clinical group: the blindnesses and amblyopias consecutive to suppression of the menses, or coming on at the time of these epochs. A part of these cases, probably the most numerous, are the result of uterine affection complicated by an infectious optic neuritis, having for its cause the abdominal trouble. Then, another part of these cases, less in number, are consecutive to hemorrhages in the orbit or in the sheaths of the optic nerve, hemorrhages to which has been given the ill-chosen designation "vicarious." The primitive infectious disease may be located in any part of the genito-urinary tract. I am attending at the present time a woman subject to an infectious neuro-choroiditis with regular exacerbations, consecutive to periodic returns of an old cystitis, with staphylococci, a cystitis the origin of which is unknown.

Optic neurites consecutive to inflammations of the sinuses have drawn attention successively to the frontal, maxillary, and sphenoidal sinuses. Periostites and ostites which invade the fatty cellular tissues of the orbit easily explain the genesis of an optic neuritis, but such cases are rare. The same may be said of traumatic cases, or those consecutive to surgical operations in the nose. Ordinarily it is, in these instances, a matter of empyema of a sinus, complicated or not with an osseous affection. Such inflammations of the sinuses are consecutive also to influenza, to measles and scarlatina, to erysipelas of the face, and to typhoid fever. Patients often attribute an important rôle to traumatisms which have occurred at times more or less remote, and previous to the purulent collection. The diagnosis is but rarely simplified by the presence of a fistula. Certainty in the diagnosis may be established in case of the maxillary sinus by means of a small incandescent lamp introduced into the closed mouth in a darkened room. Cases of ocular affections consecutive to dental periostitis are, in many instances, explained by the intervening maxillary empyema. Chronic rhinitis, with or without ozaena, the morning discharge of pus, the exacerbating pain having its centre at the level of the sinus, are the most characteristic symptoms of an abscess of the sinus. An erysipelatous redness at the root of the nose with tumefaction of the eyelids accompanies empyema of the ethmoidal sinus, while redness, with swelling at the forehead, and especially at the orbital circle, is observed in advanced empyema of the frontal sinus. In the absence of redness, the sensibility to pressure of the orbital walls is an important sign. I have not been able to recognize any symptom of abscess of a sinus in the cases of ozaena complicated with optic neuritis which have been presented to my observation, and the absence of any purulent collection in the cranio-facial sinuses has been confirmed by the clinical history, by illumination, and by catheterization. In the first of the cases observed there was an idiopathic atrophic ozaena, odor slightly offensive, yet characteristic and with reduced secretion; the second case was one symptomatic of ulceration of the left middle turbinated bone, with a terrible odor, and with an abundant secretion. The two cases are no-

table from their long duration. The first patient, thirty-four years of age, has been subject to ozaena from early youth. Seventeen years ago he submitted to a radicle operation. Since then he makes free irrigations of boric acid solutions twice a day, with the result of mitigating the foetid odor. Of late, owing to a multiplicity of occupations, these attentions have been somewhat neglected. The nose, slightly flattened, is rather dry. Exploration with the speculum shows the turbinated bones of right side small, leaving very spacious cavities lined with a shining membrane. There was complete absence of tonsils. The turbinated bones of left side were wanting, and the posterior portion of the septum had, in like manner, disappeared, the whole having been resected seventeen years ago.

This patient consulted me July 27, 1892. He had observed during the last ten or fifteen days an obscurely veiled portion situated at the lower and inner part of the visual field of the left eye. In this portion objects are indistinctly seen, and with fringed borders. The obscure portion is projected into a space brighter than in the uniform field, a space resembling that of the polarimeter or of the microscope.

The eye itself feels heavy and fatigued, and the head dull. At evening the patient sees only the upper half of letters in reading. The central visual acuity is normal for both sides. Examination by the perimeter revealed a large irregular scotoma in the left visual field, comprising almost the whole of the inferior half, but without extending to the point of fixation. By the ophthalmoscope the papilla of the right optic nerve was found red and swollen, the redness and swelling being located almost exclusively in the superior part of the papilla, encroaching a little upon the lower half only at the nasal side. On this side, at the level of the horizontal diameter of the papilla, was seen a small hemorrhage between the fibres of the optic nerve. It was close to a branch of the central vein which was much swollen. Questioned in regard to his ozaena, the patient declared that the nose had suffered long before the appearance of the visual troubles. Meanwhile, the secretion, hitherto scanty, was arrested. A thorough examination revealed no indication of any affection

of the sinuses, and the patient had never observed at any time an abundant discharge.

This patient does not present any disease or constitutional vice by which we may explain the origin of this partial papillitis. My first impression was that there would be found empyemia or caries in the ethmoidal sinus and cells. During more than two years of observation, no symptom has become manifest which could justify the supposition. It seems, therefore, probable that it is a question of a partial optic neuritis consecutive to ozæna. This supposition, the only one possible for explaining the origin of the affection, becomes the more probable as the amelioration of ocular trouble progresses in proportion to the improved condition of the nose. The lacuna of the visual field completely disappeared after three months, although the ophthalmoscopic lesions have never entirely ceased to be visible. The scotoma has, however, reappeared on several occasions, as the result of fatigue from much walking, or from reading. The border of the superior half of the optic disc remains indistinct, and the nervous fibres are less than normally transparent. These alterations indicate the existence of an interstitial neuritis.

The treatment, from the commencement, has been directed to the condition of the nose. The irrigations of boric acid solutions twice a day have been replaced by irrigations, frequently repeated, of resorcin 1-100. Iodide of potassium taken in the dose of 1.50 grammes daily induced an iodic coryza which facilitated the cleansing the membrane. The treatment was supplemented by mercurial frictions to the forehead and temple and the application of the artificial leach to the left temple. This treatment was immediately followed by a diminution of the scotoma, the limits of which had extended to the point of fixation. The scotoma at the same time became less dense and less troublesome. But it was only after three months that the patient ceased to observe the appearance of the field of the microscope and polarimeter. The perception of colors, which was completely absent in the lower half of the field of vision at the commencement of the affection, is not yet completely re-established. In this part of the field, colors appear to the patient different from those in the rest of the visual field.

In the second case, a woman aged twenty-seven, the ocular affection is double. A watchmaker by trade, she has been obliged to abandon her calling by reason of insufficient vision, which has failed during several years, and which has not been improved by convex glasses, which have on several occasions been prescribed. Having lost the place of domestic which she has occupied during two years, she has found employment in a tailor's establishment, where the indifference of her vision renders her work difficult and often impossible. In the morning she sees passably, but after a time at work, of more or less duration, a cloud which covers a part of the visual field extends in such a manner as to obscure her work.

Central vision is considerably diminished, being 1-3 normal for the right, and 1-2 normal for the left. The lower half of the visual field is absent on both sides. The line of separation, which is irregular, is changeable, and encroaches upon the point of fixation. Accommodation is normal.

With the ophthalmoscope there is perceived at the first glance a great difference between the inferior and the superior halves of the papillæ of the optic nerves. On both sides the upper halves are red and swollen, and poorly defined. The changes are more pronounced in the left than in the right. The retinal veins are very full.

The patient enjoys excellent health and shows no trouble which affords a clue to cause and effect with an ocular affection, except an ozæna existing since her early youth. She is forced to snuff water into the nose several times a day in order to render her condition endurable to those who are about her. The first cleansing in the morning brings out a large quantity of matter, but the patient has never remarked anything resembling carious bone. The left nasal fossas, especially the middle turbinated bone, are covered with yellow crusts, emitting an intensely nauseous odor. The posterior portions of the middle turbinated present a superficial alteration which does not expose the bone.

In this case the treatment was directed exclusively to the nasal affection. Warm irrigations of boric acid solutions served to prevent the formation of crusts, and were presently followed

by a notable amelioration of the pituitary swelling. The central acuity of vision and the extent of the field of vision augmented in degree and proportion to the amelioration of the nasal trouble. From 5-15 for the left and 5-10 for the right, the first had become 5-10 and the other 5-6 after ten days of treatment, and the ophthalmoscopic symptoms had almost disappeared in this brief time.

These facts establish the coincidence of a nasal affection coming within the great class of ozænas, with an ocular trouble characterized, as shown by the ophthalmoscope, by an interstitial inflammation of the optic nerve. Does there exist the relation of cause and effect between the two affections? It must be said that there is no symptom which proves this directly, but it seems to me that there are circumstances which render it very probable.

The clinical and ophthalmoscopic symptoms are in both cases characteristic and almost identical: a lacune of the visual field comprising the lower half, and perceived by the patient as a cloud or veil. The visual organ becomes easily fatigued, and the fatigue is followed by an enlargement of the scotoma. With the ophthalmoscope there is observed a papillitis of the superior halves of the optic nerves, the lower portion being normal, or nearly so. This localization of a papillitis is very rare, and has not been observed, so far as I can discover, except in affections of the base of the brain and of the skull.

No symptom permits us to suppose the existence of such an affection in the two cases described, especially in the first. By a process of exclusion one arrives at a recognition of the pituitary affection as the cause of the optic neuritis.

Is it a case, in such instances, of a propagation, by gradual approach, of the infectious process by the vascular or lymphatic canals, or of the distant action of toxines, as we observe it in the Loeffler bacillus in post-diphtheritic paralysis or the bacillus of tetanus? The facts observed do not apparently permit of a decision of the question. The symmetrical localization in the two cases observed argues in favor of the propagation by gradual approach by means of a pre-existing channel. On the other

hand, it is not to be forgotten that neuritis is often the result of infectious action at a distance, or of intoxicants.

In that which concerns the relations which can exist between optic nerve affections and the visual field, I refrain from any conclusion. An autopsy alone could clear up that interesting point.

Whatever they may be, I have thought it fitting to record the facts, leaving to future observers the task of elucidating the points still obscure, and to confirm or refute the above explanations.

THE HISTORY OF ARTIFICIAL EYES (1)

By Dr. **PANSIER** (Avignon).

The custom of painting the eyes dates from the greatest antiquity. Paris, son of Priam (*vide* Philostrato in Heroicis), and Sardanapalus painted their eyes and eyebrows.

This custom has been perpetuated, and to-day how great is the number of those who follow the example of these fabled kings.

“Pour réparer des ans l'irréparable outrage.”

This embellishment which art brings to nature may be considered as a first step preceding the history of ocular prosthesis. It only began at the time when man employed artifice to hide a deformity which resulted from the loss of an organ.

After this began the first prosthesis, the *ecblepharon*, the origin of which is prior to Paul of Ægina.

The art of the sculptor also incited man to attempt to obtain an exact representation of the appearance of the exterior of the eye. Phidias (IV. Cent. B. C.), wishing to bestow infinite pains upon the execution of a statue of Minerva destined for the Parthenon in Athens, made of ivory every part of the body except the eyes, the iris of which was made of a stone specially selected.

(1) Fragment of a brochure in course of publication. Maloine, éd. Paris.

Artificial eyes must have been employed by primitive peoples to give to their mummies a more lifelike aspect. "Father Acosta, and Garcilasso de la Vega declare that they saw mummies of the Incas and several Mamas which retained their hair and eyebrows, and which had been supplied with eyes of gold" (Buffon: Article on Mummies). Certain ancient peoples of the New World furnished their mummies with eyes of cephalopods. These eyes, which are very calcareous, are susceptible of acquiring a fine lustre, and they are in demand by the jewellers of New York, who introduce them into ornaments as a novelty in precious stones.

In the article "*Prothèse*," in the *Dictionnaire des sciences médicales* of 1820, it is stated: "Mummies had the eyes replaced by a plate of silver coated with white enamel." Ritterich questions this assertion, saying: "The nature of the mummies themselves renders this fact improbable, since the bodies were enveloped in plaster bands in a way which covered the eyes, thereby making such an embellishment useless."

However, the process of preservation itself seems to indicate the removal of the ocular globe: "According to Herodotus, the brains were removed through the nostrils, and as they were drawn out they were carefully replaced by perfumes. Then the stomach was cut near the flank with a well-sharpened stone and emptied" (Buffon: Article on Mummies). It is hardly probable that the ocular globe was respected, the desiccation of which in its place was difficult to accomplish. And as Diodorus Siculus adds, in speaking of mummified bodies, "They were not disfigured in any way," the ocular globe must have been replaced by some foreign substance.

Ritterich, although doubting its credibility, cites the following fact: "In the *Indicateur archeologique* of Gérard, 1850-51, it is said of a mummy unwrapped at London June 11, 1850, that the eyes were found to have been made of a white material, with the pupil (that is, the iris) made of obsidian." I do not see why the fact should be questioned. The ocular cavity being empty, the Egyptian embalmers would have conceived the idea of filling it, and of pouring in, for example, the plaster with

which they impregnated their bandages. A piece of obsidian, a stone with a glassy enamel, resembled the iris quite closely.

Moreover, if we are to believe Hazard-Mirault, the Duke of Chaulnes found artificial eyes in Egyptian mummies, badly made and rudely painted. They consisted of a small silver capsule covered with a layer of white enamel, in the centre of which the iris was represented by a brown circle of a single tint, and the pupil by a black and slightly prominent point.

The Egyptians endeavored to reproduce exactly, in their statues, the external appearance of the eye by means of stones of different colors.

The statue of Ra-em-ké, one of the most beautiful survivals of the art of ancient Egypt, is thus described: "The eyes, which have so lifelike an expression as to be disquieting, are enveloped in bronze cases which represent eyelids, the eyeballs themselves being formed of a piece of opaque quartz, in the centre of which a rounded piece of rock crystal represents the pupil. Under the crystal is fixed a brilliant nail which determines the visual point and produces that expression so strikingly lifelike" (Viardot: *Les merveilles de la sculpture*, p. 7). This statue must have been made about the year 4000 before our era.

Four plaster masks discovered in Egypt in the great Oasis are thus described: "The eyes had been reproduced, and, according to the methods in use from the dynasties of the first Pharaohs, were incrustated with a layer of plaster which lent them the brilliancy and smooth appearance of the living eye" (Maspéro: *La Nature*, 1892, p. 306). These busts appear to date from the end of the second century of our era.

In Greece and in Rome this custom continues.

Aristotle relates that in his time some statuettes existed which were even provided with movable artificial eyes. Plutarch tells us that the Spartans tore out the eyes from the statue of Herion before his death, at Leuctra.

In Rome there were makers of artificial eyes for statues:

M. RAPILIVS SERAPIO HIC
AB ARA MARMOREA
OSCVLOS REPOSVIT STATVIS
QVA AD VIXIT BENE.

At the Louvre there may be seen, among the statues of ancient Rome, an Antinous the eyes of which are made of rare stones.

Anastasia, the librarian, in recounting the gifts made to the churches by the Emperor Constantine, mentions four angels made of silver, each weighing 120 pounds, with eyes of precious stones.

Finally, history preserves for us the name of L. Licenius Patroclus, *faber ocularius*.

The idols of certain barbaric peoples of Asia were provided with artificial eyes: "Qui consistant e globules corralenorum globulorum more vitro aut plumbo effectis" (Mauchart).

In the tombs of the early Delaware Indians of North America have been found statuettes of wood and terra cotta the eyes of which were represented by two small white beads (*La Nature*, 1892, p. 261).

Up to this time we have seen artificial eyes more or less perfected only for statues and mummies, but no real prosthesis.

"The invention of the artificial eye," says Guérin, of Lyons (Reported by Deval. *Traité des maladies des yeux*, p. 10, 38), "seems simple enough. An old ape, doubtless of some importance, had, no matter how, lost one of his eyes. He had filled the cavity of the orbit with a mixture of clay and plants of different colors. The whole formed a globe of a composition about the color of the eye that remained. The fraud was only recognized after his death. The reliable naturalist who related this story to me as a fact assures me that nothing surprised him, in the course of his travels, so much as this trait, which illustrates all the sagacity that is recognized in this animal."

I confess that I am quite incredulous in regard to this anecdote, and even if it were true, it would only prove that the monkey, like man, has an innate sentiment, that of concealing from the sight of his fellow-creatures the deformities with which he is afflicted.

Ocular prosthesis must have been known and practised very anciently in Egypt. Ocular medicine among the Egyptians was practised by the priests; their reputation for skill had spread far

and wide. Herodotus (Carron du Villars: *Guides des maladies des yeux*, 1888, T. I., p. 93) tells us that Cyrus, King of the Persians, sent ambassadors to Amazis, King of Egypt, praying him to send him the most skilled oculist in Egypt. The refusal of Amazis to listen to this appeal so aroused the indignation of Cyrus that a declaration of war immediately followed.

The Egyptian priests, who enucleated the eyes of their dead that they might insert into the orbit a body intended to replace the natural organ, must have been the first to extend the blessing of this art to the living subject.

"Already," says Woolhouse (Thomas Woolhouse: *Experiences de différentes opérations manuelles et des guérisons qu'il a pratiquées sur les yeux*. Paris, 1711), "in the days of Ptolemy Philadelphus (III. Cent. B. C.) there prevailed a custom of substituting for the ocular globe which had been destroyed by accident, abscess, or any other cause artificial eyes of different kinds."

Woolhouse professed even to have found in the history of Ethiopia mention made of a workman who made a fortune by manufacturing artificial eyes of gold. Woolhouse did not add from what historian he had derived this information, and Mauchart not having been able to confirm this assertion, nor discover the source from which he had collected these facts, gave no credence to them.

Paul of Ægina, who lived in the seventh century of our era, was familiar with the artificial eye, and the description that Ambrose Paré gives of the eclepharon was borrowed from this Greek physician. This fact, therefore, seems to confirm the assertion of Woolhouse, for the eye of gold in use in the time of Ptolemy was a kind of prosthesis much more perfect than the more clumsy eclepharon, and if Paul of Ægina had known of its existence he would certainly have mentioned it.

Sennertus (Sennertus: *Pract. Méd.*, p. 881. Wittenberg, 1627) reports that a certain Minadous relates that he had seen at Byzantium a woman who wore an artificial eye. He does not say who this Minadous was, or when he lived. Ambrose Paré is the first author who gives us an exact description of the artificial eye. We read in the works of A. Paré, 1579, 22d book,

on the manner of supplying an artificial eye: "They should be of enamelled gold, and of a color resembling that of the natural eye." To the text are added four figures showing the form of these eyes, and their inner and outer surfaces.

In the Paris edition, 1628, following the preceding paragraph and figures, we read: "And if it happens that the eye cannot be introduced within the orbit, another must be constructed, like the one seen in the figure, made of woven iron wire bent into shape and covered with velvet or silk, having one side smooth, so that it will not irritate, and the other side covered with polished leather, to which the painter, by his art, may give the appearance of the natural eye. This done, it should be placed on the orbit. This wire is pliable, and may be bent into proper shape, like the fillet worn by women to hold their hair. The end may be passed over the ear and half-way around the head." Malgaigne remarks that Paré (*Les œuvres d' A. Paré*, édition Malgaigne, T. II., p. 604) acknowledged that he had borrowed this text from Paul of Ægina. This leads us to believe that even in the time of Paré, this instrument of prosthesis, so imperfect, and which Mauchart later called the *ecblepharon*, was no longer in use, but was mentioned only as an historic reminiscence.

The authors that we encounter later reproduce the descriptions of A. Paré, some literally, others adding to them interesting information.

Fabrice d'Acquapendente is the one who gives us the most complete details in his chapter "*de eruto et amisso oculo*" (*Édition de Venise*, 1619, p. 181). From his time commences the manufacture of eyes from glass. We are somewhat surprised, therefore, when we see Gaugot and Spillmann (*Arsenal de chirurgie contemporaine*, T. II., 1872) attributing this improvement to a glass-maker of Nevers, "who about 1740 rejected the metallic plate and made eyes of painted glass." Fabrice d'Acquapendente tells us also that when the ocular globe had entirely disappeared they used a spherical artificial eye.

Jessenius (*Instit. Chirur.*, Witteberg, 1601) tells us of the value of the form of prosthesis in his time, and says that there lived in

Venice a Florentine goldsmith who made artificial eyes with astonishing skill.

The artificial eye was, however, a rare thing, since Worm (*Museum seu historia rerum rariorum*, *Lyon*, 1655, chapitre de "artificiosis et vitreo," p. 362) classes first among his curiosities an artificial eye of glass. They were careful, in the prosthesis, not to wound the stump, and so covered the posterior surface of the eye with a layer of lead, a metal easy to polish. As a matter of fact, the eyes of that epoch appear to have been much more flat than those which we employ to-day, and unfortunately their posterior surfaces were apt to press on the stump.

Franck of Franckenau (*Satyr. Med.* Lips, 1722) and Lamzwerdus (in *Sculteti Armamentario c. observ.* Lamzwerdus et Verduini, 1741) re-edit the description of Paré.

Saint-Yves (*Traité des maladies des yeux*, 1732) in the chapter "concerning the operation on the eye suitable for the application of a false eye," insists on the necessity of preserving a large stump if it is desired that the eye should have great mobility.

Nuck (*Experimenta chirurg.*, 1728, chapitre de "oculo artificioso") tells us that eyes were made of glass, or even of enamelled metal. Eyes of gold and silver had, therefore, rapidly fallen into disuse. To accustom the orbit, he advised that a piece of lead, of the same form as the artificial eye, be worn for the first few days.

Laurent Heister (*Institutiones chirurgicæ*. Amst., 1750, p. 596) devotes an entire chapter to artificial eyes.

Here is the process employed by an enameller of Nevers about 1750 to manufacture a glass eye: "He traced on the top of a white bead, blown on the nozzle of a pipe, a brown or blue circle, in the centre of which he placed a dark point to mark the pupil. After having given an oval form to this glass shell he opened the lower part of it and smoothed the edges in the flame of a lamp."

We have passed rapidly over the works of Heister, which appeared at the same time as the thesis of Mauchart ("Oculus artificialis," *Tubingen*, 1849). The latter, comprising 24 pages,

s the first complete treatise on ocular prosthesis. We must then come on to 1852 to find a new study truly scientific and medical. This work, the last that has appeared, is due to Professor Retterich of Leipzig.

Mauchart, after having treated quite at length the history of this subject, enumerates the different kinds of eyes that were found: some were for the purpose of giving a physical demonstration (Hamberger: *Dissertatio acad. physico-mathem.* Jena, 1708) of the anatomy of the eye (Verle: *Tractatus anatomice artificialis oculi humani*, in *Opuscula nova anatomica.* Lyon, 1680, p. 170).

In a third category we find some examples intended to represent artificially the different diseases of the eye. At the time of Mauchart, the Parisian artists had acquired in this respect a well-merited reputation. These three categories did not enter into the limits of the study of Mauchart. In the beginning of his thesis Mauchart commenced by discarding the possibility of ocular grafting: "Taliacotii artificio, quo laboriosissima ac ingeniosissima methodo per insitionem, nasos, auriculas, labia oris truncata restituit e traduce viræ carnis felicissime, cujusque vestigia secuti sunt alii, vel hinc tamen inoculi deperditione locust non est, quod si, vel maxime, reliquiis et radici bulbi deperditi novum liceret globum adsuere ac conserruminare carneum, nullus tamen oculi naturalis vel color, vel nitor posset conciliari." This would tend to prove that for a long time the question of ocular grafting had been agitated.

Mauchart divided artificial eyes into two classes: the ecblephari and the hypoblephari.

The ecblepharon was held on the eye by an iron band around the head, as we have seen by the description of it given by A. Paré. It possesses only an historic interest.

Hypoblepharon is the artificial eye that occupies the orbit in the place of the destroyed eyeball. Formerly, says Mauchart, artificial eyes were of gold or silver, *pigmentis vitrescentibus obducti quem galli vocant*: enamelled. For more than a century, he adds, metal has been replaced by glass.

After having indicated in what cases one can employ pros-

thesis, and the operation required in the presence of a stump too large and painful, Mauchart describes to us in what manner it should be seized to insert or to remove the eye. Some practitioners cover the posterior surface of the eye with wax or lead, but he objects to this practice as uselessly increasing the weight.

Every night the artificial eye should be removed, cleansed with saliva, and dried. The ocular cavity should be cleansed with different liquids, the formulas of which he gives. For his part, he prefers tepid baths applied with a sponge soaked in rose water.

For a long time Venice held a monopoly in the manufacture of glass. A Draconian edict confined the glass-makers to the island of Murano; fugitives were punished with death, and the sbirros were paid and delegated to attack them wherever else they carried their industry. Artificial eyes, also, made in Venice enjoyed great favor for many years. But the secrets of the manufacture of glass escaped from this proud republic in spite of the ostracism of its laws. In Bohemia the art of glass-making presently developed and perfected itself.

In 1665 Colbert bribed some Venetian workmen with gold. Already there existed in France some glass factories, but it was from this epoch on that the industry of glass work took a great stride. In the end of the eighteenth century the glass-makers of Venice had completely fallen from their former splendor.

Ritterich, trusting to this old renown, attempted to produce some eyes at Venice. "The eyes that I have had sent from Venice," said he, "are of glass, and are for use only in wax figures. However, one of my patients reported to me a successfully made copy, but he died suddenly before giving me the address of the manufacturer."

In 1770 eyes were still made of glass. "Artificial eyes are made of painted glass" (Gendron: *Traité des maladies des yeux*, Paris, 1770).

Meanwhile, Sarck invented porcelain eyes, which were clumsy and inconvenient.

The manufacture of eyes of enamel seems to have arisen in the second half of the last century, but we do not know to whom belongs the honor of this improvement.

In 1818 Hazard-Mirault published his practical treatise on the artificial eye.

One should not exaggerate the importance of this work. From a scientific point of view, he simply translated and reproduced the essay of Mauchart.

“It was this great artist who first succeeded in making eyes of enamel, imitating nature so perfectly that often it was impossible to distinguish the artificial from the natural eye.” It is thus that Gaugot and Spillmann express themselves in regard to Hazard-Mirault. It is exaggeration. Ritterich had in his possession eyes which had been given him by Hazard the elder; he compared them to those of other manufacturers without recognizing any superiority in the former.

Hazard-Mirault must have been the first to make a transparent cornea separated by an anterior chamber from the iris located 3 millimetres posteriorly (Gaugot and Spillmann).

I believe that we must deny to Hazard-Mirault the honor of this discovery, and I base my assertion on the following: “Ritterich gives as the medium thickness of the eyes of Hazard and Desjardin a quarter of a line for the conjunctiva, a line and a half for the centre, where the cornea and the iris are represented. Now the dimensions of the eyes that Mauchart had in his possession are a half-line, and a line and a half for the thickness of the cornea and iris.” I do not see, therefore, what improvement was introduced by Hazard-Mirault.

As regards resemblance, the glass eyes of the seventeenth century had arrived at a degree of perfection unsurpassed by our eyes of enamel.

Render unto Cæsar the things that are Cæsar’s. The treatise of Hazard-Mirault is an excellent work, but possessing little originality. Hazard had especially the merit of perfecting the material side of the manufacture of the artificial eye. He shared this honor with Desjardin père.

Desjardin fils, in his thesis (*Essai sur l’hydropisie suivi de réflexions sur l’ophtalmoplastie*. Paris, 1837), devotes some pages to the memory of the work of his father, which he afflicts with the barbarous name of Ophthalmoplasty. Custom has not preserved this scientific word.

After Hazard-Mirault we enter the contemporaneous period where we take up the works of Boissonneau (1848), more commercial than scientific.

We must still mention a monograph of Abbas, published in London in 1844, which we have not been able to procure. It is reviewed in *Annales d'Oculistique*.

Finally, we must give the place of honor to the treatise of Ritterich, already cited, to which we have had frequent recourse in our historic study. This author attempted, about 1850, to introduce into Germany the manufacture of enamel eyes, and it is known, besides, that the German manufacture tends more and more to supplant the French industry in this respect. Even the artificial eyes sold in France are in part actually supplied by Germany.

A STUDY OF ACUTE PURULENT INTERSTITIAL KERATITIS.

By Dr. **Du GOURLAY** (of Dinard).

Purulent keratitis is very common in the departments of Ille-et-Vilaine and Côtes-du-Nord, and compromises each year a great number of eyes in this region. If trachoma is here almost unknown and purulent ophthalmia is rare, malignant purulent keratitis amply replaces them as an element of destruction; so, in affirming that it alone causes the destruction of a quarter of the eyes lost in our region, I think I am not departing from the truth.

It seems to me, further, that this disease takes a severe form in our provinces more frequently than is ordinarily encountered, and that it assumes a special type; and it is therefore my wish to record the symptoms which I have observed.

The onset is always abrupt; it follows very closely upon the immediate cause ascribed by the patient; this cause is invariably an injury or the entrance of a particle of dust between the lids. The bulbar conjunctiva becomes injected very shortly with a vivid redness (this is the first symptom that the patient notices); the corneal margin is covered with a fine vascular network, more

apparent and more dense in that portion of the cornea where the inflammatory process is imminent, if it has not already appeared. Presently the conjunctival injection rapidly increases; on the third or fourth day after its appearance, although the central spot is as yet scarcely visible to the naked eye, an idea of the extreme acuteness of this affection may be acquired from the intensity of the photophobia and lachrymation. The least ray of light causes an abundant flow of tears and brings on a violent spasm of the orbicularis. Vision, which is at first disturbed only by the tears and photophobia, becomes more and more confused, even though the corneal nucleus is no larger than the head of a pin. The seat of the inflammation can, however, be easily distinguished, which is invariably in the centre of the proper corneal tissue, leaving perfectly transparent the epithelium and Bowman's membrane.

In some cases I have been able to see, three days after the appearance of the conjunctival redness, what I call the product of inflammation, as large as the head of a pin. It is easily visible between the lamellæ, presenting its usual characteristics: of a yellowish gray color, strongly reflecting the light, encircled by a gray halo, shading off insensibly into the surrounding healthy tissue. It is always in this way that I have observed this diseased nucleus make its appearance, and that I have watched it increase with most alarming rapidity. Very rarely multiple foci are observed, in which case they are very near each other and soon fuse into a single focus. Invariably, also, it is toward the anterior chamber that the destruction of the corneal elements proceeds. Soon the membrane of Descemet is forced in by this compact fibrinous mass, which I cannot refrain from comparing to the core of a furuncle. Owing to its elasticity and resistance, this membrane, which seems to serve as the envelope of the new growth, forms a hernia in the anterior chamber, opposing for a longer or a shorter time the entrance of the diseased mass into the lower portion of this cavity.

I have said that the epithelium and the anterior lamella are not at first altered; the vitality of these membranes is not really affected until the deposit has fallen into the anterior

chamber. They become infiltrated, however, and lose their transparency; they may even become necrotic, making in this way an open breach for the exit of the lens, a complication which exposes the deep parts of the eye to an infection capable of inducing a panophthalmitis. Fortunately, however, this is not always the case; the exudation is often seen to be limited; the anterior membranes, although altered, forming a barrier sufficient, if not to hinder the escape of the aqueous humor, at least to oppose the exit of the lens.

The phenomena in connection with the iris also assume a serious character: the pupil is seen to dilate, is clogged with plastic matter, and becomes totally insensible to atropine. The detachment of the plastic mass is then imminent, and very soon, by virtue of the law of gravitation, it will have gained the lower part of the anterior chamber, simulating an hypopyon, for which it has certainly been mistaken.

The principal subjective symptom of this disease is pain; at first local, and compared by the patient to a feeling of dirt in the eye, it rapidly extends to the forehead and temples, and sometimes even to the face and the entire corresponding side of the head. Every day it becomes more intense, until the moment when the aqueous humor can escape through an incision or a spontaneous opening.

The photophobia is of the most pronounced type, and the lachrymation is constant; the tears are burning, very acid, and easily produce small excoriations of the skin of the lids, which increase the suffering still more.

In a more advanced stage the conjunctival secretion may become thickened, and may present at times a certain amount of purulence. Indeed, the violence of the various symptoms should be taken into serious consideration in establishing a diagnosis. They foretell that the small corneal blemish, which is about to be found between the lamellæ, is to become in its growth a destructive element of the most formidable character.

The progress of the typical form of the disease is, like its onset, most acute and rapid.

We have seen above that the appearance of exudation may

occur three days after the exciting cause; that five days after this it may involve a quarter of the cornea, form a hernia into the anterior chamber, and a short time after break into this cavity. In all, about ten days suffice for the morbid process to complete the first three stages of its evolution; in the less severe cases, fifteen days are necessary for it to reach this point. It would be fastidious and without interest at that stage for the practitioner to estimate the necessary time to effect destruction, or to bring on the graver complications, since all hope of a return of vision is then lost. All our attention should be concentrated on the other stages, which give at least a faint hope. It is well to know that the progress of the disease may not go beyond the first stage. Although I have never been able to witness it without energetic intervention, it may be supposed that after a longer or shorter period the nucleus may be reabsorbed, but not without leaving visible traces of its passage. It is then always a steady progression which must be assisted; so one should not wait to see the exudate make its appearance in the anterior chamber, but shortly after the onset assist its fall into this cavity. When once the fibrinous mass is detached from the cornea it may be spontaneously expelled through an opening in this membrane on about the eighth day.

In the more serious cases, fortunately rare, the escape of the lens is not long delayed, a precursory sign of a general infection of the organ which leads to panophthalmitis.

The period of repair follows closely on the spontaneous or provoked expulsion of the exudate. Between the reabsorption of this product and the total loss of the eye there is a large class of cases terminating by a flat cicatrix adherent to the iris. The pupil is then obstructed by plastic masses when it is not covered by the cicatrix. In spite of this, in one or two months the anterior chamber is in part restored, which allows a hope of some return of vision. Although this result seems meagre, it should never be underestimated, especially if the patient has already lost one eye. Many are the unfortunates to whom, in similar circumstances, I have been able to give enough sight to resume their calling, or at least to guide themselves without the aid of

others. It is useless to dwell upon the gravity of the prognosis; it is always serious, while in the most favorable cases an indelible opacity remains in the cornea which, depending on its position, may more or less considerably diminish the visual acuity.

The general condition, constitution, and age of the patient should be taken into consideration in giving an opinion on the final issue.

But before expressing an opinion a thorough examination of the lids and lachrymal ducts should be made. Patients with a drooping of the lower lid following blepharitis and lachrymal troubles inspire greater apprehension than others with comparatively healthy lids.

Other things being equal, however, the position of the exudation should also be seriously considered. Indeed, the result of my observations has been that all infiltrations situated below the transverse diameter of the cornea are less to be feared than those above. I have observed numerous cases who did not come under my care until the last stage, who nevertheless retained the upper portion of the cornea perfectly transparent. The exudate was attached to the altered portion, forming a hernia through the loss of substance of this membrane, and was easily extricated by means of forceps. After careful irrigation and proper attentions, the cicatrix has been formed under excellent conditions.

Far more serious is the prognosis of exudations situated in the upper portion. The result of observation is that in this region the infiltration spreads more rapidly and is less amenable to treatment.

Onyx or unguis and infectious ulcerating keratitis (serpiginous ulcer) are the affections which it is important to differentiate from that under discussion. In general, onyx (interlamellar suppurative keratitis) has an onset and course far less acute. The symptoms of pain and photophobia are far less accentuated. It occurs most frequently in young scrofulous subjects, in contradistinction to acute interlamellar keratitis, which belongs solely to old age.

In short, unguis is composed of an actual collection of pus, more or less thick, but having neither the color nor the density

of the coagulum above described. A true exudation of pus has no more tendency to open a passage for itself toward the epithelium than toward Descemet's membrane. When it pours into the anterior chamber it does so through a fistulous tract more or less visible, and accumulates at the bottom of the cavity to form a true hypopyon. It never appears under the form of a compact mass enveloped by the inner membrane, as in acute interlamellar keratitis.

Serpiginous ulcer, after having infected the anterior chamber, does certainly at times present the form of a more or less dense mass; but there is always fluid pus at the bottom of this mass which escapes with the aqueous humor, and the small coagulum which is found has no resemblance whatever to the compact mass, which is always removed intact, either with forceps or the knife, in cases of acute purulent interstitial keratitis.

Furthermore, in the beginning, confusion with the ulcer is impossible, as the latter always attacks the epithelium and anterior lamella.

Without doubt, there may be difficulty of diagnosis, and it frequently occurs at a more advanced stage, when, after perforation of the cornea, the anterior chamber is filled with a fibrino-purulent deposit. The density of the coagulum alone designates with which of the two affections one is dealing.

This form of keratitis is found solely in adults and old people. I have never seen it in children. The youngest of my patients was thirty years of age; but the greater number of those whose record I have preserved were over forty; they were nearly all laborers in the fields or sailors. About one-quarter of the cases were women, most of whom were peasant women more or less occupied on the farms.

The scrofulous diathesis or the lymphatic has seemed to me to be a predisposing cause; but the preponderance should be given to the various lesions of the lachrymal apparatus and chronic blepharitis, especially when the latter is accompanied by an ectropion, even though slight. There is assuredly a relation between this interstitial keratitis and blepharitis with misplacement or obstruction of the lachrymal openings, which is fre-

quently seen on the Breton coast; for in eight cases out of ten that have come under my observation I have found a previous lesion of the lachrymal apparatus or the lids.

Among the exciting causes, I always find a direct injury to the globe, at the least the penetration of dust between the lids. The more acute cases seem to be produced by injury from a twig or beard of grain, or the entrance of the finely powdered particles prevalent in hay-lofts. I must also mention the injuries to the globe arising from the débris of brushwood, composed of spines, thorns, and briers, and from the fragments of stone which are broken for roads. All these objects can easily contain pathogenic germs capable of causing an infection in the eye.

In the absence of any precise means of histological analysis I cannot certify to the exact composition of this focus of disease which I have so often extracted either from the cornea or from the anterior chamber. Its physical character has already been described; it is always of a globular form, very compact and viscous. Its color varies between a dull gray and clear lemon yellow. Its size varies, according to the period of growth, from that of a grain of wheat to that of a pea. On microscopical examination (obj. 1, ocl. 1 Nacet), the mass appears to be almost entirely composed of fibrin, enveloping the corneal corpuscles, which are more or less recognizable; many of these corpuscles are altered by hypergenesis and fatty degeneration. On the border are found proliferating nuclei in abundance, and numerous leucocytes. Several attempts have been made in the laboratory to discover a special micro-organism which might be the cause of this disease. Up to the present time only bacteria which are already known have been found: the staphylococcus accompanied by the streptococcus, the latter particularly abundant. While awaiting further researches I may be allowed to attribute the malignity of this affection to the union of these two pathogenic microbes.

It seems logical to employ an antiphlogistic method against this affection, which assumes such an extremely acute character. But as the greater number of patients present themselves in an

overworked condition, and enfeebled by suffering, it seems better to employ tonic and constitutional medication in the meantime, to diminish the excess of vascularity. I have continued, in spite of contra-indications, to give on the first days small amounts of calomel, powders of hydro-bromate of quinine (0.20), and small doses of amorphous aconitine. But the principal efforts should be directed to finding proper means to bring about a regeneration of the diseased tissue. In the first place, heat is employed in the form of a lotion or embrocation, either with aromatic infusion or the less irritating antiseptic liquids (hot boric acid solution). These lotions always give relief, but the patient prefers a warm, moist bandage.

In the initial stage, in order not to increase the irritation, I have employed a 3% solution of boric acid; but at a more advanced period, when the cornea has given way and the diseased mass has entered the anterior chamber, I have had recourse to a solution of sublimate (water, 1,000; sublimate, 0.25). Despite the painful sensation from this solution, I have not hesitated to use it, as it prevents the conjunctival secretion from becoming purulent.

After this lotion, repeated two or three times a day, I instil several drops of a collyrium of eserine, then, before replacing the bandage, I introduce between the lids ointment of yellow pyoctanine or aristol.

If there is iritis, or if the loss of substance in the cornea is not peripheral, I substitute sulphate of atropine or salicylate of eserine.

The surgical methods employed, according to the stage of the disease, are:

1st, grattage; 2d, cauterization; 3d, keratotomy with or without cauterization.

Grattage seems to be indicated in order to reach the diseased nucleus situated between the layers of the cornea. The first step of the operation is easily made with a small knife with slightly convex blade; the diseased product may also be removed with the same instrument, though it is more convenient to use, for this purpose, a small sharp curette.

The actual cautery is, however, more efficacious than curet-

ting, as in this way the entire purulent focus can be destroyed. It results from what has already been said that this energetic and radical method should only be employed when the exudation is still confined between the layers of the cornea and before it projects in any way into the anterior chamber. Nevertheless, during this period the disease is always arrested if an opening is made into the anterior chamber by means of the galvano-cautery.

Keratotomy, which Sæmisch first applied to the treatment of serpiginous ulcer, is an heroic method which may be employed at any stage of the treatment.

It is a method which is less destructive to the cornea than the actual cautery, and which leaves slighter traces. Unfortunately, it does not always succeed, and then recourse must be had to the cautery.

If the surgeon hesitates, during the first period, in his choice between these two methods, he should always employ keratotomy when the exudate, in pressing upon the internal membrane, has extended toward the anterior chamber ; the indications for this are more pronounced if the purulent mass has already reached the lower part of the anterior chamber.

In cases where cauterization or incision is adopted the operation can be easily conducted without forceps or retractor, as the cornea from the onset has lost its keen sensibility. This should, in fact, be avoided, as the least pressure on the eyeball causes considerable suffering.

As far as possible, the puncture and the counter-puncture should be made in healthy tissue, which is easily done if the diseased portion is not too extensive ; in the latter case, after the puncture the point of the blade is directed straight to the middle of the exudation, but the counter-puncture should be terminated at the limit of the diseased tissue. The incision thus made in healthy tissue often opposes an effective barrier to the disease ; if this does not serve, after being well assured of a renewed invasion, the edges of the wound should be freely opened with the fine point of a galvano-cautery, and the anterior chamber should be washed out again, a procedure which I always adopt

after a corneal incision, with a 1 to 2,000 solution of bichloride. If the fibrinous mass has fallen into the lower part of the anterior chamber, and it is not possible to remove it on the blade of the knife or by washing it out, it should without hesitation be seized by a small pair of forceps, with which it can be removed *en masse* by a single effort, without further damage, provided care is observed not to seize the iris.

Most frequently, cauterization after corneal incision definitely arrests the progress of the disease. In case it does not, nothing will succeed: the cornea, almost completely altered, will only form a large leucoma; it will be fortunate if the remains of this membrane are sufficiently resistant to prevent the formation of an irido-corneal staphyloma, which leads to a long course of suffering and danger for the patient. In spite of all precautions, the expulsion of the lens is sometimes brought about, and, as an almost certain consequence, panophthalmitis is induced of such a severe type that enucleation becomes necessary.

When the stage of repair begins, the attention and care of the physician should continue daily, if possible. In fact, the process of repair will be greatly influenced by the after treatment. If the loss of substance has been considerable, or if the epithelium or Bowman's membrane is infiltrated and fixed to the iris, a warm moist bandage should be applied day and night to prevent their separation, and this may be compressive or not, according to the indications.

Twice a day the bandage should be renewed and abundant irrigation employed with a warm aseptic or antiseptic liquid. The collyria or ointments before mentioned may be used if required.

It is of the greatest importance that the bandage should be worn for a long period, as a firm white scar is frequently obtained in this manner. If it is not worn for a sufficient length of time the patient is exposed to the danger of irido-corneal staphyloma. In my opinion, the bandage, which need not be moist and warm after the scar has commenced to form, should be worn for from six weeks to two months without interruption. The greatest service can be rendered to patients if, during this

long period when they no longer suffer, the time can be improved to rectify, if they exist, any functional defects in the lachrymal apparatus. The condition of the lids should also be attended to, and the diseases or anomalies which may be present (blepharitis, ectropion) remedied.

Case I.—B—— H——, aged 46, a day-laborer at Saint Servan. Acute malignant interstitial keratitis. Complete destruction of the exudate by electrocauterization. Rapid recovery, with a slight non-adherent scar.

Case II.—P——, housewife at Pleugueneuc (Côtes du Nord), 58 years of age. R. E. lost, L. E. malignant interstitial keratitis. Grattage and actual cautery. Aggravation. Keratotomy. Recovery. Scar non-adherent.

This case is interesting, as three days after the injury I was able, at the hospital at Dinard, to follow the development and progress of the disease. When she came to consult me at Dinan at the end of June, 1891, I had her come to Dinard, recognizing that the condition was very serious. The diseased point, situated between the layers of the cornea at its upper and temporal portion, was the size of the head of a pin. Three days before, while cleaning a hay-loft, she had felt dust enter between the lids. Marked bulbar redness. Fine pericorneal injection. Severe frontal pains. Photophobia and intense lachrymation. Medical treatment: Warm moist bandage. Grattage and ignipuncture penetrating into the anterior chamber. Two days after, symptoms aggravated. The fibrinous mass had advanced into the aqueous humor. Keratotomy. The mass was half the size of a pea, and adhered to the blade of the knife. Irrigation of the anterior chamber with bichloride 1 to 2,000. Bandage. After recovery, I observed that a non-adherent cicatrix had formed and that the anterior chamber had been restored. A month later, the corneal cicatrix was firm. No more lachrymation or sensitiveness. In September the leucoma, though apparent, did not greatly disturb sight.

Temperament lymphatic. Lower lids thickened. Lachrymal trouble for two years.

Case III.—Supero-internal keratitis. Antiseptic lotions. Relapse; cauterization (thermocautery). Remission, then a new attack. Escape of the lens. Panophthalmitis. Atrophy.

Case IV.—Superior keratitis. Keratotomy. Irrigation. Cicatrix adherent above. Six months later, anterior chamber restored below. Iridectomy with satisfactory result.

Case V.—L. E., keratitis situated at the lower portion of the cornea. Keratotomy. Irrigation. Recovery. Cicatrix non-adherent.

Case VI.—*Keratitis dating from fifteen days before. Lower portion of cornea involved. Extraction of the mass with forceps after enlarging the corneal opening. Leucoma flat and adherent below. Pupil free. Upper portion of the cornea transparent.*

P——, master of a coasting vessel, 65 years old (Saint Lunaire). Thirty years at sea, worn out, rheumatic. Misplacement of the lachrymal points. Received an injury from a blade of wheat on the right cornea in August, 1891. Came to consult me fifteen days afterward; the cornea was softened and perforated below. The exudate filled half the anterior chamber. In enlarging the corneal opening with scissors I extracted the mass with forceps. After irrigation with bichloride, a bandage was applied and renewed twice a day. One month later the cicatrix was completely formed; the upper half of the cornea was transparent, while the lower was leucomatose and flat.

Case VII.—B——, farmer at Plancoët, 65 years of age. Corneal effusion of fifteen days' duration; injury from a blade of wheat in August, 1891. R. E., infiltration occupying two-thirds of the superior diameter of the cornea; keratotomy; irrigation; application; symptoms aggravated; actual cautery; prevention of escape of lens. Leucoma nearly complete; six months later, iridectomy with small success.—L. E. lost a long time before.

Case VIII.—B——, 55 years of age, an old sailor. Lower lids deformed, slight ectropion. In May, 1890, received an injury on the left eye while cutting dried brushwood. Eight days later, I observed on the lower portion of the cornea an interlamellar exudation about the size of the head of a pin. Grattage and cauterization by means of a small thermocautery; escape of aqueous humor. Rapid improvement; one month later, several small synechia in the pupil; the corneal scar quite small, and interfering very little with vision.

Case IX.—P——, 65 years of age, farmer, is quite old and worn out. Lids red, eyes inflamed. Lachrymation. Consulted me to-

ward the end of April, 1887; gave as the cause of his trouble the entrance under the lids of a grain of dust from a hay-loft which he was cleaning. After fifteen days of suffering, I found that the usual mass had become detached from the lower portion of the cornea and filled the anterior chamber. Incision; extraction easy; antiseptic irrigation, bandage, and the usual treatment. One month later, cicatrix adherent and flat; upper portion of the cornea quite transparent, with corresponding restoration of the anterior chamber. Relapse in the same eye two years later, at harvest time. After twenty days, panophthalmitis so severe that, considering the prostration and fever of the patient, I enucleated the eye under chloroform.

Case X.—Mme. R——, widow, Saint Lunaire; 60 years of age; nervous temperament; slight lachrymal trouble in the left eye for six months. Occupation, farming. In August, 1892, after a day passed near a threshing machine, was seized with violent pain in the left eye. Three days afterwards, I could see very clearly, under the epithelium and Bowman's membrane, a nucleus of interlamellar keratitis as large as the head of a pin. As the patient refused to allow surgical interference, I instituted medical treatment: warm moist compress, collyrium, cocaine, and salicylate of eserine, ointment of yellow pyoctanin, calomel in large doses. For a week this treatment gave some relief to the pain and arrested further development for a time. In continuing this still further, recovery might have ensued; but, losing patience, the patient allowed me to make a small puncture. The inflammatory product was quite small, and came out fastened to the point of the knife. There was no irrigation of the anterior chamber, which I left open for several days; after the inflammatory phenomena had completely subsided I allowed the wound to close. Several weeks passed, and the eye was still somewhat sensitive, but recovery with a small, insignificant scar was certain.

CLINICAL NOTES.

VASCULARIZATION OF THE ANTERIOR SURFACE OF THE LENS IN CASE OF CHRONIC IRIDOCHOROIDITIS.

By Dr. A. DARIER.

Mlle. L——, 42 years of age, no hereditary history, no personal taint, apparently in very good health, never any uterine disturbance,

menopause at 36 years, typhoid fever at 28. Some vague articular(?) pains.

1880, congestion(?) of the left eye, which disappeared under atropine in ten days.

1891, another attack of short duration.

March 5, 1892, iritis with slight disturbance in the vitreous humor, which disappeared only after five months of mercurial inunctions.

In July, 1892, the right eye was in its turn attacked.

The patient was submitted to hypodermic injections of bichloride; after a series of sixty-six general injections and thirty sub-conjunctival injections, with periods of rest intervening, a marked state of amelioration was obtained. But each period of rest was followed by a renewed attack.

Salicylate of soda, pilocarpine, and iodide of potassium in large doses, were all without effect.



Iris and papillary space much enlarged; uveal deposits and synechia upon the lens, with many vessels and small hemorrhagic points upon the surface of the iris; and with fasciculi of vessels upon the anterior lens surface.

The disturbance in the vitreous humor only became more marked; the fundus of the left eye was seen with great difficulty, but presented no pathological change beyond the trouble in the papilla; no trace of central or peripheral choroidal spots.

The vitreous was clouded, and filled with scarcely movable floculi; the pupillary orifice dilated with difficulty, in spite of large doses of atropine and scopolamine.

Numerous uveal deposits and posterior synechia were seen at the centre and on the borders, which are represented in the annexed

drawing by Dr. Barclay. At the lower internal portion of the pupil extending from the free border of the iris, or rather from its posterior surface, are seen four vascular branches, two arteries, and two veins, very distinctly ramifying in a fine network on the anterior surface of the lens.

The iris itself was infiltrated, thickened, œdematous, and slightly discolored. Vessels, new formations, and small hemorrhagic spots were seen on its surface.

R. E., iritis with posterior synechia, without disturbance of the vitreous humor.

It is of no avail to enter upon further details of this case, in which I wish merely to call attention to one peculiarity rarely observed. I at first supposed this vascularization to be corneal, but quickly recognized, in causing the patient to direct the eye up or down, that it was not displaced with the surface of the cornea, but always retained the same relations with the pupillary orifice and the border of the iris from which it seemed to extend. Its position was, then, on the anterior surface of the lens. The fact was too evident for discussion. There existed then an abnormal development of arterial and venous vessels on the lower internal third of the anterior surface of the lens.

I have not been able to find an analogous case in ophthalmological literature; nevertheless, such cases may exist more frequently than is supposed, but pass unnoticed because examinations are not always made with sufficient illumination or with lenses of sufficient strength.

It was in the month of May, 1894, that I saw this vascularization, which I at first supposed had developed in the cornea itself, owing to its decided resemblance to those frequently observed in some forms of keratitis and almost invariably in interstitial keratitis. Hirschberg, who has made a special study of these latter cases, has described several in his *Centralblatt für Augenheilkunde*.

By employing, as he does, an ophthalmoscope provided with a lens of +20 to +30 dipters, I have been able with ease to study the actual conditions.

Are we to consider this vascularization as antecedent to an actual pathological process? May we suppose that we are deal-

ing with the remnants of a pupillary membrane? I have searched ophthalmological literature without finding a similar case.

No records relating to the persistence of pupillary membranes bear any resemblance to the accompanying diagram. Nearly all the cases have been reported in literature associated with conjunctival extension or fibres traversing the pupil or inserted on the anterior surface of the lens, but in none was the presence of actual blood vessels mentioned without at the same time a number of fibres from the iris being inserted on the anterior surface of the lens. Nothing of the sort exists in this case.

How could this vascularization be produced? The patient has for years been subject to frequent attacks of iritis, which have left visible traces in numerous points of adhesion between the border of the iris and the lens, and uveal deposits are still seen extending to the centre of the pupil. The iris itself is infiltrated and cedematous, if I may use this term; its color is altered, and on examination with a strong lens various areas of abnormal and pathological vascularization, and even small hemorrhages, may be seen, which are easily distinguished in the diagram.

Is this vascular bouquet spread over the anterior surface of the lens simply a prolongation of the abnormally developed vessels on the surface of the iris? This does not seem to be the case, as no continuation of the vessels which start from the border of the sphincter or the posterior surface of the iris can be seen.

It is probable that, before the time when the patient came under my observation, a pupillary exudate was formed which led up to the vascular network which is at present seen.

Is this form of iridochoroiditis with vascularization of the iris and the lens of frequent occurrence? For my part, it is the first case I have observed. No specific history could be obtained from the patient; she had none of the hereditary specific signs so well described by Hutchinson.

In the way of therapeutics, after considerable hesitation, I at last decided to perform an iridectomy, which seems up to the present time to have produced a beneficial result. The vessels

have shrunken, and seem no longer to contain blood. The ocular media have slightly cleared, but the tension still remains sub-normal.

SEPTIC IRIDOCHOROIDITIS CONSECUTIVE TO A UTERINE HEMORRHAGE.

By Dr. E. VALUDE.

The case is that of a woman of about forty years of age who had had no disease of any sort and whose eyes had been perfectly good. Wednesday, November 7, while engaged in washing, she was taken with an abundant metrorrhœa, which obliged her to leave her work and quickly take to her bed. The physician called believed that he had to do with a miscarriage, and prescribed accordingly. The patient remained in bed, and the flow continued in diminished quantity during three days. The prostration was great and there was fever, but no signs of uterine inflammation or infection; there was neither pain nor excess of abdominal sensibility, and the discharge was without odor. During the progress of these phenomena, on the evening of Thursday, November 8, the patient was seized with pain in the left eye, and it was presently seen that the eye became swollen and red.

In a short time the ocular pains acquired a considerable intensity, and the swelling of the parts became extreme. There was conjunctival chemosis and exophthalmia. There was an absence of conjunctival secretion, a fact which opposed the hypothesis of an acute conjunctivitis.

At the same time the general condition of the patient took an unfavorable turn, the prostration becoming more extreme, and the patient complaining of continued nausea, which was at length succeeded by vomiting. There were no chills. At length the sanguineous flow was arrested and there was no further uterine trouble.

When I saw the patient she stated that she had been in a

state of continual fever, had taken no nourishment, and that the attacks of nausea had been frequent; unfortunately, as I did not see her during the early period of the disease, I know nothing of the temperature at that time. Leeches applied to the forehead by the attending physician caused a slight diminution of the severe pains experienced by the patient. A few hours after the onset of the first ocular symptoms, vision was completely abolished in that eye.

I was not called to examine the patient until two days after the onset of the trouble, November 17. I saw that the eye was slightly prominent, but that it was mobile, and that the movements were painless, facts which excluded the hypothesis of an inflammatory or rheumatic affection of the orbit, such as phlegmon or tenonitis, which always induces an absolute or relative immobility of the organ. Furthermore, the appearance of the eye suggested an inflammation of the deep membranes: a chemotic swelling of suspicious aspect in the lower part of the conjunctiva; the iris dull, swollen, immovable, and projecting slightly forward; the anterior chamber diminished in depth and filled with a suspicious-looking fluid; and the pupil with a yellowish appearance, which left no doubt as to the condition of the vitreous humor. The latter was opaque and infiltrated with pus, if not transformed to a purulent mass. There was an extreme pericorneal congestion, which explained the violent cyclitic pains experienced by the patient. Further, the ciliary body was extremely sensitive to the touch, and the tension of the eye was somewhat increased.

Both the cornea and the conjunctiva were intact, and it was impossible to find the point of entrance of this infection, which menaced the integrity of the deep membranes of the eye. The patient had received no injury to the eye—at least, no evidence of this could be obtained.

The trouble was, in short, a purulent iridochoroiditis, a phlegmon of the eye in process of development. With the hope of alleviating the symptoms, I prescribed repeated applications of vesicants to the temple, inunctions of belladonna ointment, and laudanum poultices applied to the lids. At the same time

tonic treatment was instituted to restore the forces of the patient.

On the 26th of November I saw the patient again in a little more satisfactory condition. The general health was improved, and the eye was no longer painful. It was still red, however, but the pericorneal congestion was less marked. The pupil retained its yellowish appearance, and the vitreous humor was still opaque. The tension of the eye was rather diminished.

The progress of the acute purulent iridochoroiditis had evidently been arrested, and in spite of the intensity of the initial process, it was now certain that purulent destruction of the eye would not result. But the vitreous humor was so infiltrated with leucocytes that it was hardly probable that it would completely recover its transparency. Vision was therefore compromised and the eye subjected to all the vicissitudes which follow an iridocyclitis of such severe form as this had been. So much for the prognosis.

The most interesting question is the cause of this iridochoroiditis, which evidently was not of direct external origin, as the cornea was perfectly intact. The infection of the deep membranes of the eye is closely connected, by relation of cause and effect, to the metrorrhœa, possibly arising from a miscarriage. The prompt onset of the ocular disturbances the evening of the day after the hemorrhage, and the absence of any uterine infection, does not allow of the supposition of a septic inflammation developed in the uterus and transported to the eye by a process of metastasis. I am more inclined to think that the uterine mucous membrane, lacerated by the numerous vascular ruptures brought on by the accident, was the door of entrance of an infectious germ, which proceeded to develop in the ocular media, so well adapted to its propagation. The uterus, while serving as the door of entrance, remained free from infection. Salo Cohn, in Germany, and Gendron, in France, have in quite recent articles reported various observations relative to accidents of this kind. My object has been to add a new fact to this category, as the observation of such cases is still rare.

II.—REPORTS OF SOCIETIES.

OPHTHALMOLOGICAL SOCIETY OF PARIS.

Session of January 8th.

DR. VIGNES.—(*Referring to the proceedings of the former meeting.*—Discussion of the communication of Dr. Kalt on the treatment of purulent ophthalmia by irrigation. See *Annales d'Oculistique*, December, 1894.)

In the discussion on purulent ophthalmia I stated that perforated blepharostats do not effectually irrigate the conjunctival surface, as the conjunctiva presses against the orifices and easily obstructs them through the contraction of the orbicularis.

As I have not had occasion to employ the lid-elevator of Dr. Lagrange, I wish to say that since I have seen the figure of this instrument published in *Annales d'Oculistique* it seems to me that the defect which I have attributed to the perforated blepharostat does not apply to the instrument of our distinguished colleague.

New Phenic Preparations.

DR. GALEZOWSKI recommends phenate of mercury in diseases of the cornea, especially in herpetic phlyctenular keratitis. This preparation is an advantageous substitute for yellow ointment, which is at times irritating.

As a wash or instillation, the following solutions :

Distilled water.....100 grammes.

Phenate of mercury..... .0 gr. 010 milligr. to 0 gr. 047 milligr.

As an ointment :

Lanoline.....10 grammes.

Phenate of mercury.....0 gr. 05 centigr. to 0 gr. 10 centigr.

The author recommends the avoidance of cocaine in herpes of the cornea, inasmuch as this is an anæsthetic disease. The above preparations should not be used until steam douches or mydriatics have reduced the congestion ; they should, however, be discontinued if they are not well borne.

In addition to these external preparations, Dr. Galezowski has also employed phenate of gold internally, in the form of hypodermic injections. This medication seems to produce good effects in optic atrophies. In tabes the atrophy is arrested under their influence and the shooting pains disappear.

However, further researches are necessary in this direction.

Dr. Dehenne.—I think that ointments and topical applications should be avoided in all superficial affections of the cornea, except atropine, which is to be used according to the indications. Mercurial ointment in particular should be avoided. When I have obtained asepsis of the conjunctival sacs and nasal fossæ I practise occlusion of the eye, which has been so justly recommended by Dr. Valude, and the phlyctenular keratitis improves rapidly. It is necessary, however, that the conjunctiva should be free from purulent secretion.

Dr. Gorecki.—I take this occasion to draw your attention to the mercuric preparations which are useful in chronic cases. The properties of yellow oxide of mercury vary according to the method used in its preparation. Ordinarily a solution of sublimate is precipitated by a solution of caustic potash, so that according to the strength of the solutions, the temperature, and the excess of one or the other, a precipitate is obtained varying from a canary yellow to a reddish yellow, whose density and molecular state vary according to the amount of oxidation.

In this last respect I have obtained the opinion of an eminent chemist, who prepares aniline colors, and who has observed, as I have, the differences in the amount of oxidation.

Uniform products can, then, only be obtained by rigorously following identical procedures.

I only speak, however, of preparations conscientiously made; though if ten prescriptions for yellow ointment be given to ten different pharmacists, ten different medicines will be obtained. It is well understood that ointments made with an old preparation of oxide or obtained by a dry method are totally different.

Dr. Vignes.—It is surprising that phenate of mercury should not be a local irritant to the eye, as subcutaneous injections of the salt are very painful, a fact which would lead one to suppose that it would be irritating.

Dr. Galezowski.—I also think that occlusion of the eye is of advantage in superficial keratitis, but the use of phenate of mercury allows me to obtain the necessary antisepsis.

Notes on the Construction of Contact Glasses.

DR. SULZER.—The principal difficulties encountered in the formation of these glasses arise from certain exigencies, which are :

1st. The necessity of adapting the curvature of the surface to the form of the sclerotic in different patients.

2d. The absolute precision of these surfaces, which should allow of clear vision in spite of the curves of short radius.

3d. The perfect freedom from irritation by the borders of the scleral portion, which should be, for this reason, perfectly smooth and polished.

It would at first appear that the best method of obtaining such glasses would be by the method of blowing, and that the necessary lightness and thinness could not be better realized than by the aid of the enameller's lamp.

However, all practical attempts in this direction have proved ineffectual. Either the surfaces obtained from the lamp are not perfectly curved, or the material is soiled by spots and impurities which disturb vision. In short, the various portions have different densities, and therefore the indices of refraction are correspondingly different. The rapid tempering, which is brought on by cooling, establishes in the piece subjected to blowing that peculiar molecular state characteristic of Prince Rupert's drops. Hence, the danger to the eye is the greater, since the rupture of the glass might happen very inopportunately, causing much trouble.

In applying to contact glasses the usual methods employed in shaping optical surfaces great difficulties will be encountered. Here it is not a simple spherical surface, but two surfaces cutting each other in their common diameter.

Futhermore, it is necessary to adapt the central cup to the scleral rim by a slight modification of the exterior spherical curvature. In short, it is necessary to give different radii of curvature to the internal and external surfaces.

To obtain homogeneous material and a state of equilibrium which despite the elasticity of the glass will not permit of possible changes of form, it has seemed best to take the piece from a cubical mass of glass carefully chosen.

The greatest difficulty is encountered in forming the central cup.

The successive stages of polishing should not be performed in crossed directions, but only in a direction following the common diameter of the surfaces bordering on the pole of the central cup. This simple suggestion will suggest the peculiar method of polishing

which has been adopted by the excellent workman who is charged with this task; but the difficulties in its execution will also be suggested.

When the glass has been formed and polished certain special features must be added (see these *Annales*, Vol. CX., p. 335), in the form of one or more gutters in the scleral rim to allow the exit of tears or air bubbles. Here again practical difficulties are numerous, but as they are not properly connected with the refraction of the system I will not lay stress upon them here.

The last difficulty which is connected with the form of the extreme border of the piece is not the least, as the defects of the edges often render it impossible to wear the glass; this difficulty has been overcome by the optician Séguy, and MM. Benoist and Berthiot have been able to construct glasses, after these suggestions, without the earlier defects.

The new process consists in heating the glass shell in ovens of successively higher temperature and then subjecting it to the flame of an enameller's lamp, maintaining the same temperature as the last oven until it is softened but not melted by the heat. A support of asbestos prevents contact of the glass with a cold utensil, by which it would be cracked. In this manner the regular form is maintained.

I take the opportunity to express my warmest thanks to the house of Benoist, Berthiot & Co., as well as to M. Séguy, who have so greatly aided in solving this problem.

Optic Neuritis Following Ozæna.

DR. SULZER.—(*See the article in full in this number.*)

Dr. Chevallereau.—These phenomena of the visual field, hemianopia and scotoma, are not common in affections of the optic nerve itself, in neuritis. Is this not a disturbance of the cerebral circulation rather than an actual neuritis?

Dr. Meyer.—The facts described by Dr. Sulzer greatly resemble the amaurosis and optic atrophy described by Ziem in disturbances of the nasal fossæ. Dr. E. Berger has also called attention to such cases. Still, what is most astonishing in these cases is the rapidity of recovery.

Dr. Koenig.—I think, with Dr. Chevallereau, that this should be considered as a disturbance of the cerebral circulation rather than as a neuritis. In a local disturbance, such as neuritis, I do not see how such marked divisions of the visual field could be produced as have been described.

Dr. Vignes.—I do not think that the existence of scotomata excludes the idea of neuritis. I presented to the French Society of Ophthalmology a case of hereditary neuritis in which there were very characteristic scotomata.

Dr. Sulzer.—The facts to which Dr. Meyer calls attention have been carefully separated in my article in the observations which I have communicated. Optic neuritis following sinusitis, orbital cellulitis, and osseous troubles produced by a nasal operation is easily explained. No conclusion can be arrived at in the cases which I have had the honor to present to you except by means of an autopsy. The facts have been presented to my observation as I have stated them, and have seemed worthy of attention, and I read them without drawing a definite conclusion.

OPHTHALMOLOGICAL AND LARYNGOLOGICAL SOCIETY OF BORDEAUX, 1894.

Wounds of the Eye by Shot.

DR. BADAL.—Fifteen days ago, M. P—— was struck in the left eye by a small shot from the discharge of a gun thirty metres distant.

Almost immediately after the accident, sight was lost and the patient came to me.

The anterior chamber was filled with blood, the eye was very soft, and the outer portion of the cornea, about one millimetre from the limbus, in front of the external line, presented an irregular orifice, which was evidently the point of entrance of the shot. The eye was very painful, and the patient complained of all the symptoms of iridocyclitis.

Supposing that a foreign body was lodged in the eye and that it was a source of danger, I enucleated the eye. On opening it, I found the retina detached by an extensive hemorrhage situated between it and the choroid, and no trace whatever of the foreign body in the eye. But behind the equatorial portion of the sclera and externally, an orifice was found precisely similar to the first; this was the point of exit of the shot, which had crossed the sclera quite obliquely, from side to side.

On examining the choroid it was easily seen that the shot had

penetrated to the ciliary region, and that it had destroyed a region of three millimetres in diameter; further, fifteen millimetres beyond was another perforation of the choroid, which was altered and adherent to the sclera at this point.

This is the second time that I have found such a wound of the eye from shot by which it has been traversed.

I am led to think that hereafter it will be best to wait and not enucleate an eye wounded under similar conditions; as the shot which is lodged in the orbit is in general very well borne and the eye preserves its form and gives no occasion for surgical interference.

Dr. Lagrange.—I have seen a patient with the same conditions as those described by Dr. Badal. A shot had penetrated the eye, and I proposed enucleation, which was refused. Some time after, I saw the patient again with the eye in very good condition. In the future I shall be more reserved and wait until enucleation is necessary.

Circumscribed Abscess of the Ciliary Process.

DR. FROMAGET.—R——, eighty years of age, came to the ophthalmological clinic of the *Faculté de médecine*, complaining of severe pains in the left eye.

About two months before, in shooting a gun, a piece of the cartridge perforated the cornea and produced inflammatory symptoms, which disappeared at the end of three weeks. The pain appeared again fifteen days ago, and became intolerable.

A linear cicatrix of the cornea was found, almost vertical, and situated on the median line a little towards the internal side.

The anterior chamber was half filled with pus; the iris was greatly changed and fastened to the lens by strong synechia, and in the pupillary field a purulent exudate prevented deeper examination. The conjunctiva was very much injected and slightly œdematous. The ciliary region was quite painful. In the presence of a commencing panophthalmitis, enucleation was proposed and performed by Professor Badal. On examining the eye after removal, the following lesions were found:

The retina, detached in almost its entire extent, enclosed the vitreous humor quite fluid and abundant.

All the posterior portion of the choroid presented its normal appearance. It was neither thickened nor purulent. But in the anterior portion, towards the internal region of the ciliary process, interesting disturbances were found. Behind the lens, pressing back the vitreous humor, was found an abscess the size of a small nut.

Both the anterior and posterior surfaces of the lens were covered with pus. I opened the abscess, and found in the middle the portion of cartridge that had brought about the disturbance. It was rectangular in form, and measured three by four millimetres.

The lens, which I had expected to find injured, was intact, which gave proof of the direction in which the foreign body had entered the eye.

It had perforated the cornea from without inward, and from right to left in a very oblique direction; afterwards it had torn the zonule of Zinn without touching the lens, and, at last, lodged in the ciliary region, where it was first encysted and had then brought about the phenomena of a limited suppurative cyclo-choroiditis.

It is quite certain that if enucleation had not been performed we would have been obliged later to treat a suppurative panophthalmitis.

Such circumscribed abscesses arising from foreign bodies are rare.

Blepharoplasty by Temporal and Frontal Flaps.

DR. BADAL.—A young patient was troubled from infancy with a cicatricial ectropion of both lids of the right eye. The ectropion was quite pronounced, and prevented complete closure of the eye, so that an ulcerative keratitis resulted from the lagophthalmos.

This cicatricial ectropion, following the burning of the face, dated from early childhood. Not only the lids were burned, but the skin of the frontal and temporal region.

By reason of the cicatricial state of the tissues surrounding the orbit, I made two cutaneous grafts for the superior and inferior ectropion, with flaps taken from the arm. Only one took effect, and that was quickly thrown off. A year later the patient returned to me in the same condition as before. Ten months ago, I attempted blepharoplasty for the upper lid with a flap taken from the forehead, the pedicle of which was situated at the root of the nose. The first operation was successful, and two months ago I made the attempt to restore the lower lid with a temporal flap, in spite of the cicatricial state of the tissues. The flap was 8 centimetres long by 1 centimetre wide, and was of the form of a lengthened S, in order to avoid too much torsion upon the pedicle.

This large flap, owing to its peculiar disposition, became firmly attached to the indurated surface, and success was complete.

It is far better to rely on autoplasty than on heteroplasty, even if the tissue used is slightly cicatricial.

A Case of Tetanus Following a Penetrating Wound of the Eye.

DRS. FROMAGET and CABANNES.—Mr. Emile—, nineteen years of age, tailor, entered the hospital the 7th of June last, during the service of Professor Badal, for an accident which had happened to the left eye, a wound from a spark from a blacksmith's anvil.

Immediately after the injury the patient suffered severe pain, the eye began to bleed copiously, and the sight was completely abolished on the injured side.

From the time of the injury, after proper preliminary attentions, the patient suffered little from his eye. Four days after the accident—that is, the 1st of June—the eye, almost entirely emptied by the injury, began to suppurate. During the four days that followed the accident the patient was put upon a milk diet, and did not resume solid food till the 1st of June. At that time he noticed difficulty in opening the mouth and in chewing. This increased on the following day, and the 5th of June—that is, eight days after the accident—the patient appeared at the clinic of Professor Badal, who admitted him for spasms of the face and ocular muscles.

When the patient was told to open the mouth the opening was at the most only one centimetre in width. The masseters were hard and contracted. The sterno-mastoids were tense and especially contracted in the sternal portion.

A most interesting fact was the fixation of the healthy eye, which the patient could not move in any direction—neither up nor down, outward nor inward.

The pupillary reflex was abolished, but the reflex of accommodation remained. The pupil was of normal size, and the amplitude of accommodation, as well as visual acuity, were normal.

The lids retained their movements.

The patient experienced no pain; there were no spasms, no partial or general convulsions, and no elevation of temperature.

On the 8th of June, the day after his entrance, the remaining portion of the injured eye was enucleated under chloroform without accident. The wound in the cornea and the sclerotic had divided the anterior segment of the eye into three irregular portions. The only noticeable point was the difficulty found in separating the eyeball, which had formed adherences with the capsule of Tenon.

On the 9th, photophobia, myosis.

Despite all treatment and the slow progress of the trouble, the pa-

tient died on the 14th of June. At autopsy, twelve hours after death, nothing abnormal was found.

This case is interesting from two points of view.

It is very rare, in the first place, to find tetanus following wounds of the eye. On the other hand, contraction of all the motor muscles of the eye suggests the facial appearance of ophthalmoplegia. These symptoms are rarely noticed, and deserve more careful attention than they have received.

Phthisis of the Eye; Ossification of the Choroid; Sympathetic Disturbance.

DR. PUECH.—A young man came to consult me with trouble in his right eye, which had lasted for some time.

Vision, formerly normal, was reduced to 1-4. The pupillary reflex was abolished. Ophthalmoscopic examination not giving any clue to the symptoms, I examined the left eye, which had for a long time been reduced to a stump, and occupied the fundus of the orbit. Palpation of this stump was painful, and supposing that the symptoms were of sympathetic origin, I advised and performed enucleation of the stump.

Eight days after, the right eye had recovered the normal tone and the pupil reacted to light.

On opening the stump I found a very advanced centre of ossification in the choroid, and attribute to the presence of this foreign body in the stump the sympathetic symptoms mentioned.

Penetrating Wound of the Eye by an Awl.

DR. FROMAGET.—The patient was a shoemaker who received a penetrating wound in the external portion of the right cornea from an awl. Forty-eight hours afterward panophthalmitis set in. During the operation of enucleation a metallic body was noticed behind the tendon of the right externus, and on removal of the eye it was seen to be the end of the awl, which projected into the orbit a distance of one and a half centimetres, and the base of which was implanted in the sclerotic at the root of the ciliary process. In all probability the awl, after traversing the eye from side to side, came in contact with the osseous portion of the orbit and was broken off, thus forming at the same time an intra- and extra-ocular foreign body.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.*Session of December 13, 1894.***Five Cases of Plastic Cellulitis of the Orbit.**

MR. LAWSON reported five cases of orbital cellulitis; in four there was no pus, and in one a small amount was formed towards the end of the process. Three of the patients died, the eye of the fourth was enucleated, and one recovered with quite imperfect vision. In one patient the lesions were bilateral. Four of the cases were met with in women, and the last was a young man.

In one case the orbital cellulitis was preceded by an acute tonsillitis; another came with the onset of a purulent eruption of the face, with elevated temperature and pains in the joints. The cause of the cellulitis was without doubt in all the cases a general infection, the origin of which in the female cases was evidently utero-vaginal.

Mr. Tweedy had been successful in one case. Sometimes orbital cellulitis can be traced to the treatment of the lachrymal canals, as one of his cases had followed cauterization of the nasal membrane, and another an operation on the lachrymal canal.

Mr. Bronner had also observed a case of cellulitis following nasal traumatism.

Mr. Critchett had seen dental lesions cause orbital cellulitis, and the latter trouble recovered after treatment of the teeth.

Hydatid Cyst of the Orbit.

MR. LAWFORD had removed a hydatid cyst of the right orbit in a young girl seventeen years of age. The tumor was accompanied with pain, with exophthalmos, a diminution in the amplitude of ocular movements, cedema of the lids, hyperæmia of the conjunctiva, and diminution of visual acuity. $V=\frac{1}{2}$. The optic papilla was swollen, the retinal veins tortuous, and the retina showed several small hemorrhages. All these symptoms appeared within two months.

After the operation for removal of the cyst the parts resumed their normal position, and the only thing to be noticed was a divergent strabismus, due, without doubt, to a partial division of the right internus during the operation.

Osteoma of the Conjunctiva.

MR. HARTRIDGE had removed an osteoma of the conjunctiva in a child three months old which measured 12 x 6 millimetres.

It was composed of bone covered with periosteum, showing in one part a cellular structure, and in the other a bony consistence.

Mr. Argyll Robertson had seen a precisely similar case several years ago.

Formol as a Hardening Agent.

MR. MARSHALL has used formol in 10% solutions for hardening the eyeball; after only twenty-four hours, it is possible to make sections. The eyeball seems to be in a fresh condition, the cornea and lens are transparent, and the iris normal. There is no change in blood or pus. The vitreous is unchanged, and both retina and choroid remain *in situ*.

Mr. Robertson had found formol an almost perfect agent for hardening purposes.

Mr. Juler was of the same opinion.

Mr. Lindsay Johnson had employed formol before Leber had recommended it in histology. It was superior to all substances formerly used. As it precipitates metallic solution, it might be of use in studying tissues.

Papillary Conjunctivitis.

MR. BRONNER reported a case of papillary conjunctivitis of the left eye due to the prolonged use of arsenic internally. Applications of sulphate of copper produced no effect in the lesion, although the discontinuance of the arsenical treatment, which was employed for a cutaneous eczema, brought about a diminution of the conjunctival productions.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX.

Session of November 30.

Monocular Dyplopia in Hysteria.

DR. LAGRANGE reported a case of monocular diplopia in an hysterical child, twelve years old. This diplopia presented characteristics dia-

metrically opposed to those assigned to it in the classics, especially by Charcot and Parinaud. According to these authors, a monocular diplopia in hysteria is always due to a spasm of the accommodation. Contraction of the ciliary muscle explains the double vision in every case. The case of Dr. Lagrange, however, was due to sensory phenomena of cerebral origin. Careful examination of the static and dynamic refraction revealed no anomalies, except an insignificant astigmatism (0.50), the correction of which had no influence on the diplopia. The patient recovered from the diplopia under the influence of hypnotic suggestion.

Dr. G. Martin.—I have had a case quite similar to that reported by my colleague, and have interpreted it quite differently. It is well known that hysterical patients are very much inclined to prevaricate to avoid going to school; to escape any work whatever, they imagine and simulate diseases of the most complex form. In cases of this kind, I have believed in simulation, and without denying the interest in my colleague's case, I would ask if some reservation should not be made in the statements of his patient.

Dr. Lagrange.—I know very well that hysterical patients lie with the greatest facility, and from the very first hour I was on my guard, as it is necessary to be in examining hysterical persons. I studied the patient every week for two months; I repeated the tests, increased the examination, and tried in every way to verify her assertions. Never did I find her at fault. The monocular diplopia is then quite as certain as that reported by Galezowski, Parinaud, etc., as my patient was examined with quite as much care and attention as those of these authors.

Furthermore, this young girl presented a typical form of hysteria, and complained of the classic symptoms relating to the color sense and the visual field with a precision, on her part, which could not have been calculated, owing to her age and isolation in the country, far from patients of her class. All her statements, from the commencement of the trouble to the end, including recovery from the diplopia, were perfectly correct.

Dr. Armaignac.—I should like to ask my colleague if in this case the diplopia disappeared when accommodation was paralyzed by means of atropine.

Dr. Lagrange.—The diplopia remained the same after the use of atropine and relaxation of accommodation.

Dr. Armaignac.—I conclude from this that the condition of refraction and accommodation had nothing to do with the symptom of

diplopia, and that this could only be of sensory origin, concerning which our knowledge is only hypothetical.

Disturbances of vision in hysteria are numerous and varied.

Sessions of December 21 and 28, 1894.

Treatment of Certain Forms of Paralysis of the External Rectus Muscle.

DR. G. MARTIN read a report of four cases of paralysis of the external rectus treated uniformly with injections of sublimate, either in the temple or in the gluteal region, and which recovered rapidly, part after the eighth injection, the others after the fourteenth. Two of these paralyzes were complete, and the other two incomplete. The first two were only of a few days' duration, the third of one month, and the fourth of three months' duration. The patients were neither tabetic nor syphilitic, but showed manifestations of rheumatism. The author is of the opinion (under reserve) that the sublimate acted for the most part as an anti-rheumatic agent; he also thinks that the form of disease presented by his four patients was not a real paralysis, although this was the only diagnosis which could be given in the existing state of science. They were not paralyzes with anatomical lesions of the tissues, but disturbances more or less pronounced of the abducting function, brought on by the rheumatic taint.

Dr. Armaignac.—These cases seem to be related to peripheral paralyzes *a frigore*, and I am quite surprised at the result produced by the injections, especially in two of the cases.

But it must be remembered that these paralyzes nearly always recover without treatment, and numerous cases are necessary to establish with certainty the influence of the mercuric injections.

Injections could be tried in old cases of paralysis, and especially in amblyopic eyes. For my part, I shall only try it in a case where all other treatment has failed.

Dr. Lagrange.—I freely admit the influence of rheumatism in the etiology of paralytic strabismus, and such paralyzes should be excluded from the general category. The majority of treatises advise this.

As for the recovery of the patients, there are two explanations to be considered.

First, recovery may have been the result of the spontaneous disappearance of the disease; second, it may [have been due to the injec-

tions of sublimate—that is, to a specific action of mercury on rheumatism.

Two of the patients recovered in three or four months, and it is not rare to see paralyzes *a frigore* recover without treatment. The other two recovered in fifteen days and three weeks. Analogous cases are not rare, and peripheral paralyzes are frequently influenced by local remedies, and the reaction following the injections of mercury seems to me to be the cause of amelioration.

As for the anti-rheumatic action of sublimate, clinical and therapeutic history does not prove it.

While granting that mercury was indicated, I should have preferred the biniodide as an injection, as the injections of sublimate are quite painful.

Dr. Sous.—Sublimate is antiphlogistic as well as antisyphilitic. In cases of paralyzes *a frigore*, sublimate can act as an agent to reduce inflammatory products, and reduces them very rapidly, more rapidly by the hypodermic method than in any other way. In this way I should explain the successful results obtained.

Dr. Martin.—In stating that recent authors are not inclined to admit rheumatic paralyzes of the motor muscles of the eyes, I wish to call attention to the statement of Dr. Panas, who says that the rheumatic variety is related most frequently to obstinate forms of tabes as yet little studied.

As to knowing whether the recovery of my patients was spontaneous or due to the medication employed, the future will prove.

CONGRESS OF HUNGARIAN PHYSICIANS AND NATURALISTS.

Session of 1894.

Sub-conjunctival Injections of Sublimate in the Treatment of Granular Pannus.

DR. SIKLOSSY.—The author first reviews the work of those who have written on sub-conjunctival injections, from Rothmund, Secondi, and Darier, in particular, up to Deutschmann quite recently.

He recommends the use of sub-conjunctival injections in conjunctival infections, even though acute. He has used them with success in acute blennorrhœic conjunctivitis; but it is more particularly in trachoma that these injections seem to produce the best and

quickest results, especially if pannus exist, even though the pannus be complicated by ulcerative lesions or an abscess of the cornea.

In the majority of cases of pannus, recovery was rapid, and after three or four injections, at intervals of two days, the vascularization disappeared, the cornea cleared up, and vision returned. The author exhibited several corroborative cases.

Dr. Siklossy advises that the technique of these injections be simplified. It is not necessary to hold the eye open with a retractor and to fix the eyeball with forceps; at least for this last purpose rubber-tipped forceps should be employed. A needle with a very short point should be used, so that it will not be deeply plunged under the conjunctival membrane.

The best strength of the solution is 1-1000; the conjunctiva should be anæsthetized with cocaine before the injection. These injections are not ordinarily accompanied by any inconvenience. It has been said that they are followed by an adhesion between the sclera and the conjunctiva, which appears under the form of a hard plate similar to those following episcleritis. This complication is rare. The author has only observed it twice in a total of 400 injections.

MEDICAL SOCIETY OF PARIS.

Session of November 10.

Burns of the Eye from Vapor of Ammonia.

DR. TROUSSEAU.—I recently had under my care a young girl of twelve years of age whose mother had caused her to inhale from a flask of ammonia for a considerable time, for the purpose of curing a cold in the head. She noticed at the time considerable smarting in the eyes, which commenced to lachrymate. That night she slept well, but on awaking could not open the lids, which were glued to each other by an abundant secretion. The morning after, she was brought to me. The lids were swollen, and the conjunctiva was not only injected, but œdematous, with an abundant muco-purulent secretion. The corneæ were intact. This condition lasted several days. Then, after applications of cool boric acid compresses, the organs assumed their usual aspect.

This is a grade a little more severe than the first grade of burns, which allows the *restitutio ad integrum* of the parts attached.

In what may be called the second degree, the symptoms are the same, but real scars of the conjunctiva are formed, and it is difficult or almost impossible to prevent a partial symblepharon, as was the case with a kitchen-maid who spilled a bottle of ammonia which she was using for some domestic purpose. This woman was ill for three weeks, and had a slight corneal halo, which disappeared, but there were conjunctival adhesions of very little importance.

The third case which I wish to report corresponds to the third degree of gaseous burns. It is much more serious, and the victim of the accident, despite the most careful attentions, can to-day barely go about unassisted. A young *valet de chambre*, who had spilled a flask of volatile alkali, was seized with violent symptoms of ocular irritation, but was not examined by me until six days after the accident, when the conjunctivæ were found of a violent red, œdematous, and secretive. The corneæ were intact, and I supposed the prognosis to be favorable, only laying stress on precautions to prevent conjunctival adhesions (frequent movements of the lids, introduction of vaseline into the sacs). I was disagreeably surprised, three days after the first visit, to find that the corneæ were inflamed. I prescribed atropine and hot water compresses, and the membranes regained enough transparency to reassure me. The condition of the conjunctiva became and remained quite satisfactory. Everything had apparently returned to the normal, when, about three weeks after the accident, the corneæ were again disturbed, became milky white, and sight was completely abolished; in short, after six months' treatment I managed to obtain slight transparency of the corneæ, and was enabled to make an iridectomy, which allowed the patient to walk with some difficulty without a guide.

I cannot be too emphatic on the gravity and insidious progress of these latter accidents. The prognosis, in cases of similar burns, should be reserved, and the tardy appearance of a corneal opacity suspected, which can appear with greater intensity after an apparent improvement. An eye may remain almost intact in appearance for several days while in reality it is seriously compromised.

The handling of liquid ammonia presents a danger so serious to the eyes that both physicians and the laity should be carefully warned. Burns from vapor of ammonia may lead to not only simple hyperæmia of the conjunctiva, but also to serious opacities of the cornea. Its progress is insidious, and the real gravity of the case cannot be determined till after several days of observation.

Dr. Abadie.—I have also had a very serious case of burning of the

eyes by vapor of ammonia. It occurred in a factory for the manufacture of ice. A large pipe burst, and the vapor of ammonia escaped in clouds under heavy pressure. Two workmen were enveloped by it; one escaped immediately, the other remained several minutes in a fainting condition, exposed to the ammoniacal vapors. The first escaped with a slight corneal leucoma, while the eyes of the other, when I saw him several hours after the accident, resembled those of a cooked fish. The cornea was opaque, milky, and indistinguishable from the sclerotic. I saw that the destruction had been complete and immediate; but what was my astonishment, on examining him the day after, to find that the appearance of the eye was due to a false membrane which covered all the ocular surface, and which I was able to remove with forceps. Underneath, I found the cornea apparently healthy. When this membranous structure was removed the man cried out with joy that he could see. But his joy was of short duration. A few days later, the lens commenced to swell and lose its transparency, and a double cataract similar to a traumatic cataract was formed, which it was necessary to extract. Vision was again restored, but little by little the bulbar conjunctiva, which had been destroyed by the chemical action of the ammonia, became transformed into cicatricial tissue. The cornea lost their transparency, and in the end the man, despite all these experiences, became completely blind. These delayed disturbances following burns of the conjunctiva by bases or acids are very ably described by Desmarres, who puts us on our guard against the too favorable prognosis which one is inclined to give during the first days, and which the grave progress of the disease very soon contradicts.

ACADEMY OF SCIENCES.

(PARIS.)

Session of December 26, 1894.

A New Entoptic Phenomenon.

DR. S. TCHIRIEW.—I noticed for the first time, at the end of last May, a new entoptic phenomenon, which I continued to observe for a

long time without being able to explain it by the peculiarities of the structure of the eye, and of which I give here a description :

The windows of my bedroom face the west. On awakening on a certain day in the month of May, between three and four o'clock in the morning, and looking at the white ceiling, which was feebly illuminated, I noticed that the entire space included in my vision was covered with a network of squares of quite regular form ; the lines of this network were quite distinct, while the spaces were less pronounced. If I regarded this network longer than was necessary for a single glance, it disappeared. If I closed the eyes, and a short time after again looked at the ceiling, I perceived again the network, which after being visible for several tenths of a second again disappeared.

On repeating the same experiment several times—that is to say, closing the eyes and then observing the ceiling—I obtained each time the same result. But as the experiment was continued the network became more and more indistinct, and finally disappeared entirely. I could close the eyes, and afterwards observe the ceiling without a return of the phenomenon.

In the month of June this phenomenon appeared to me about the same hour (between three and four o'clock in the morning). But the following months, July, August, and September, it appeared later, and in October it was not to be seen until between six and seven o'clock in the morning.

The result of measurement of these squares was that on the retina the sides were a little less than one millimetre in length.

To explain this phenomenon it must be admitted, from the fact that the outlines of the squares were more distinct than the spaces, that the perception on the retina was produced by the outlines ; and in considering that the external layer of the retina—that is to say, the layer of rods and cones—is the only one sensible to light, it should also be admitted that the perception was produced in this layer. In short, as these lines have the form of rectangular networks, it should also be admitted that in the anterior layers of the retina there exist figures having the same form and less than one millimetre square, and that the anterior layers of the retina perceive the illumination of these more easily than the others.

SOCIETY OF DERMATOLOGY AND SYPHILOGRAPHY.

(PARIS.)

*Session of November 15.***On Hereditary Ocular Syphilis.**

DR. GALEZOWSKI.—A large number of congenital ocular affections should be referred to hereditary syphilis. To make a good diagnosis in this respect it is important to discover in the different congenital ocular troubles those which present the characteristic symptoms of syphilis. In my opinion, these congenital anomalies can be divided into four quite distinct groups:

(a) *Malformations of the protective organs of the eye, of the orbit, and of the lachrymal canals*; affections which are quite rare, and in which the syphilitic origin may be proved by the simultaneous existence of lesions in the choroid and in the iris. Osseous caries and dental anomalies point to the same origin.

(b) *Paralysis of the motor nerves of the eye, ptosis, nystagmus, etc.*—For this class of lesions, frequent in very young children, and which are of cerebral origin or consecutive to infectious fevers, traumatisms, etc., it is necessary, in the absence of well-defined symptoms, to search for traces of syphilis in the cerebro-spinal axis. Dr. Brissaud informs us that in cerebro-spinal syphilis, a slowly progressive disease of early infancy, there are found, among other lesions, ptosis or monocular nystagmus with diminution of the central visual acuity, convergent or divergent strabismus, etc. The same is true of spasmodic infantile hemiplegia, which commences with convulsions and leads to isolated paralyses of the different muscles, with spasms of the antagonists, intellectual troubles, etc.

(c) *Arrest of development, microphthalmia, astigmatism, etc.*—Arrest of development, which not infrequently occurs in the eyes of children, should be, in my opinion, referred to hereditary syphilis in a large proportion of cases. I had suspected this for a long time, but was not assured of it until, in several cases of this kind, I found, by the aid of the ophthalmoscope, the characteristic changes of syphilis in the choroid and the retina. But I have also noticed that astigmatism may be brought on by hereditary syphilis, as I have had occasion to prove in many cases.

(d) *Inflammatory changes of the external and internal membranes of the visual organ.*—No one doubts to-day that interstitial keratitis is due to hereditary syphilis. Various authors, Hutchinson and

Desmarres among others, long since demonstrated this. I have frequently seen keratitis complicated with retinitis pigmentosa, and in this connection I wish to draw attention to an etiological factor of great importance: In congenital retinitis pigmentosa—which is not, as has been incorrectly stated, the result of consanguinity of the parents, but the result of an hereditary specific affection—the patient should always be treated with mercurial inunctions, the same as in the case of an acquired syphilis.

Dr. A. Fournier stated that he had also noticed the frequency of strabismus and astigmatism in hereditary syphilis.

MEDICAL SOCIETY OF GENEVA.

Session of October 3.

Treatment of Keratoconus.

DR. HALTENHOFF reported a case of progressive keratoconus in a patient thirty years of age. The right eye could only count fingers at 1 metre, and the left at 1 1-2 metres, with no improvement by glasses. The summit of the cone, situated almost in the centre of the figure, presented a small elongated oval leucoma, about 1 1-2 millimetres for the left, 2 1-2 millimetres for the right. The intraocular tension, as is frequently found in such cases, was quite feeble (18° by the tonometer of Fick); pupillary contractions were normal.

Among the different methods of treatment (central excision followed by cauterization by nitric acid according to Graefe, central trepanning according to Bowman, eserine and sclerotomy according to De Wecker, etc., etc.), I decided to employ the simplest and least dangerous, which consists in performing a repeated superficial cauterization of the summit of the cone, with the view, as in the other methods, of bringing about a flattening by cicatricial contraction.

The right eye, the worst of the two, was touched five times in twenty-two days. I endeavored to produce either a small, rounded central scar or linear burns in short striæ radiating from the centre. Several times, on removing the bandage, I found, surrounding the cauterized region, a series of small folds of the epithelium, which seemed to indicate a contraction of the underlying corneal tissues. Improvement in the vision commenced after the second cauterization. At

the fifth, the centre, which was very thin, was perforated, the chamber was emptied and required three days to become re-established. This accident, which several authors have produced intentionally, had no other inconvenience than to greatly frighten the patient and force him to remain in bed with the eyes bandaged.

At present the conicity is hardly recognizable. In observing the eyes from the side, the profile of the right cornea appears almost normal, while the left is distinctly prominent and cone-shaped. In spite of some increase in the central leucoma, caused by the cauterization, vision has increased to one-ninth without a glass, and one-seventh with a concave spherical glass of two dioptries, a visual acuity with which one is better satisfied the more he has operated for cataract, and which allows the patient to read very well—for example, signs on the other side of the street. The other eye, treated by the same method, is improving; after three cauterizations, vision has increased to about one-seventh.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS.

Albrecht von Graefe's Archiv für Ophthalmologie.

Reviewed by DR. SULZER.

Vol. XL., No. 8.

I.—**Metastatic Purulent Ophthalmia; Its Causes and Its Prognosis**, by Dr. AXENFELD.

II.—**Germes of the Conjunctival Sac and the Value of Antiseptic Ocular Ointments**, by Dr. BACH.

The author has cultivated twenty-seven forms of micro-organisms, of which ten were pathogenic, for the cornea of a rabbit, and all of which were found in the conjunctival sac of man. They were nearly all common forms of germs which had fallen from the air into the sacs.

To establish the action of tears on germs, the author made cultures with a dilution of the different micro-organisms in tears. In the majority of cases the presence of tears diminished or destroyed the vitality of the germs. At the same time, this microbicidal action of tears is not constant, either because an increase of the germs takes

place after a period of diminution or because this increase starts at the beginning of the experiment.

The physiological solution, distilled water and well water, moreover, act identically. Precipitation of the albuminoid substances in the tears only produces an insignificant diminution in their bactericidal power. Similar experiments in which the tears were replaced by the aqueous humor prove that this latter prevents only the development of the pyogenic staphylococcus. In the vitreous, this later micro-organism develops abundantly.

(The fact that cultures of different micro-organisms are destroyed in tears or a salt solution, especially if the introduction of particles of the original culture media is avoided, leads the author to attribute a bactericidal property to tears. In my opinion, the only conclusion which can be drawn from the author's experiment is that tears and the salt solution are media of insufficient nutrition.—SULZER.)

As a practical study, the author has counted the number of colonies obtained by a puncture by a platinum wire in the conjunctival sac, done before and after cleansing. The cleansing was done in part of the cases with solutions of sublimate, and in the other part with the physiological solution. The result was that cleansing with an indifferent solution produced a diminution of the germs in the cul-de-sac and the free borders in a greater number of cases than when an antiseptic solution was used. Under a dressing, increase of the microbe is more marked than without the dressing. A great number of micro-organisms may remain in the cul-de-sacs without influencing the recovery of operative wounds of the cornea and the sclerotic.

Special experiments were made to prove that the different ointments used in ophthalmology, such as ointment of yellow oxide, of sublimate, of sulphate of copper, of iodoform, and of boric acid, possess antiseptic qualities. With the exception of the last two, the experiments were made both "*in vitro*" and upon the living subject. It is often possible to sterilize the cul-de-sacs by the application of ointment.

III.—A Contribution to the Pathological Anatomy of Embolism of the Cerebral Artery, by Dr. WAGENMAN.

The eye examined by Dr. Wagenman was the seat of an embolism of the central artery, of cardiac origin, occurring one year before the death of the patient, a woman forty-five years of age. Microscopical examination of serial sections showed the anatomical base of a partial re-establishment of the circulation, which had been noticed for some time by the aid of the ophthalmoscope. The embolus was situ-

ated directly behind the lamina cribrosa. There remained, however, an interstice situated in part between the wall of the vessel and the embolus, and in part in the embolus itself. This interstice was lined in its entire length with endothelial cells. The author attributes the origin of this opening to a secondary dilatation of the vessel.

Secondary atrophy of the optic nerve had invaded the entire portion removed, which had been cut off quite near the chiasm. In the retina, the nerve fibres, and the ganglionic cells, the molecular layer and the granular layer were completely destroyed. In place of the internal granular layer was found a simple layer of granular form, composed of the nuclei of the granular layer. The fibres of this layer were sclerosed and contracted. The external layers of the retina were scarcely altered.

IV.—Researches on the Existence of So-called Exterior Accommodation, Produced by Pressure of the Muscles, by Dr. SÄTTLER.

Dr. Schneller has stated that the length of the axis of the eyeball sensibly increases in certain visual positions. This increase is shown by an augmentation of refraction independent of the curvature of the lens. The author has undertaken to test these assertions by taking all necessary precautions for the avoidance of error in the observations. He arrives at the conclusion that, contrary to the statements of Dr. Schneller, no alteration of refraction is produced in looking down and in convergence independent of interior accommodation.

V.—Origin of Zonular Cataract, by Dr. PETERS.

A discussion between the author, who explains the origin of nuclear and zonular cataracts by disease of the nucleus of the lens bringing on a shrinkage of its central portions (*vide* these *Annales*, Vol. CX., p. 61), and Dr. Schirmer, who considers zonular cataract as the remnant of a total cataract which existed during intra-uterine life, or during the first period of extra-uterine life (*vide* these *Annales*, Vol. CX., p. 306), has led to a third publication, in which the first-named author takes the same stand as in his previous work.

VI.—On Cauterization of the Sclerotic, by Dr. KUGEL.

In cases of infiltration or torpid ulcer of the cornea the author has obtained very satisfactory results from cauterization of the conjunctiva which covers the sclerotic. At the first sitting, the pencil of nitrate of silver is applied to a zone three millimetres in width, concentric to the cornea and near the limbus. If the reaction is not sufficient, the following cauterization should be more extensive, even to

the cul-de-sac, if necessary. This application is followed by a marked and prompt vascularization of the diseased portions of the cornea.

IV.—BOOK NOTICES.

BOOKS AND THESES.

Traité élémentaire d'Ophthalmologie, by Drs. NIMIER and DESPAGNET. (1 vol. of 950 pages, 432 *illust.* Alcan, éd. Paris, 1894.)

The authors have had the happy inspiration to suppress from their book all the bibliography which encumbers and obscures so many didactic treatises. This book, with a practical aim only, professes to reproduce the current ideas of oculists concerning diseases of the eye and their treatment, and succeeds admirably in doing it. It is not necessary to review one by one each of the chapters composing Drs. Nimier and Despagnet's book, which is divided, like all such treatises, into diseases of the conjunctiva, of the cornea, of the sclerotic, etc.

At the end of each chapter is found a paragraph devoted especially to operations on the ocular region treated of in the chapter, an arrangement which avoids much repetition.

The authors have given some prominence to the study of amblyopia dependent on lesion of the central nervous system. The chapter on hemianopia and the various scotomata shows careful research. The same and more might be said of the chapter on motor disturbances of the eye, symptomatic of brain lesion, and on the various ophthalmoplegias. This subject—still new, and certain points of which are still in discussion—is treated in this work with decided clearness.

The volume terminates with an exposition of the ministerial instructions relative to fitness for marine and army service.

We are indebted to Messrs. Nimier and Despagnet for a good work, which aims to present the condition of practical ophthalmology as it exists at the present time. It is a book which will be valuable not only to students, as the authors modestly state in their preface, but to practitioners desirous of information on a given question contained in a few concise and simple lines.—VALUDE.

Précis iconographique d'anatomie normale de l'œil, by
Dr. ROCHON-DUVIGNEAUD. (*Société d'édit. scientifiques*, Paris, 1895.)

As its title indicates, this little book is not a treatise ; it does not contain didactic descriptions of the various anatomical points of the organ of vision. The author takes typical histological preparations, diagrams of which are given, and explains the details of these preparations.

Dr. Rochon-Duvigneaud first shows several diagrams of the optic nerve from different points of its course. Attention should be called to one point which the author has observed, namely : the small fibrous prolongations emerging from the papilla even when it is normal, and representing the remains of the embryonic pedicle of the vitreous. He concludes that the appearances which Dr. Masselon has described ophthalmoscopically under the name of *abnormal prolongations of the lamina cribrosa* are probably the same things—that is, remnants of the embryonic fibrous prolongations of the vitreous.

From the optic nerve Dr. Rochon-Duvigneaud passes to the study of the ciliary region, occupied in the lower vertebrates by a simple ligament, and in man by the muscle of accommodation. It is in following the progressive disappearance of the ligamentum pectinatum, and then the increasing importance of the ciliary muscle, that the transition from the inferior animal races to the primates, as the ape, and then to man himself, is observed.

It cannot be said that the ligamentum pectinatum is altogether replaced by the ciliary muscle, since vestiges of it are always found, although it may remain rudimentary. The ligamentum pectinatum diminishes in proportion to the development of the ciliary muscle. The ciliary muscle belongs to the choroid, and forms an additional organ in the higher species, when it exists.

In speaking of the ciliary processes, the author criticises the term ciliary gland, which has been applied to this region ; it in no way resembles a gland, although its epithelial surface favors the production of a liquid and produces a true secretion.

The description of the choroid, of the iris, and of the iris angle will be read with interest. In speaking of the retina, the author refers to the work of Ramon y Cajal, who has studied it by Golgi's method.

The work is terminated by the exposition of a theory relative to the development of the eye and of the structure of the ocular globe in its normal state. He considers the eye as a cyst. The optic vesicle, in closing, forms, as is known, in its interior, an invagination of con-

junctival tissue, which becomes the vitreous, and an invagination of epithelial tissue, which forms the lens. The pedicles of these two organs, at first strangulated, then cut off, leave the two parts in question, the vitreous and the lens, in the condition of free bodies in the ocular cavity. This process the author calls total encystment, with suppression of pedicles. The transparency of these two organs, and their susceptibility to infection, come from their defective blood supply, since diapedesis and absorption of pathological products is slow in the absence of blood vessels.

In short, the eye being considered as a cyst, is exposed, like any cyst, to retentions of fluids and distensions of its walls, especially when it is considered that this particular cyst contains a species of gland in its interior, a fact which explains the processes of glaucoma.—VALUDE.

Du formol en thérapeutique oculaire, by DR. OLIVIER.
(*Thesis at Bordeaux, 1894.*)

The author, after considering the bacteriological, chemical, and clinical history of formol, relates that he has studied this substance in the service of Professor Badal. Twenty patients with purulent ophthalmia were treated with formol, in only two of which it was unsuccessful.

In three cases of conjunctivitis absolute recovery followed in a very few days.

Four cases of suppurating dacryocystitis were cleared up.

It was used as a collyrium in the strength of 1-200, and as a lotion, 1-100 or 1-2000.

It does not produce erythema, conjunctival or palpebral ulcerations, or corneal lesions, and is, in short, an excellent ocular antiseptic.—DE BOURGON.

Obstetrical Asepsis and Antisepsis, by DR. TARNIER.
(*Lectures reported by Dr. Potocki, Steinheil ed., Paris, 1894.*)

In the very important volume of lectures by Professor Tarnier, the part which is of especial interest to us is that which relates to the prophylaxis of ophthalmia of the new-born and treatment of purulent ophthalmia. Dr. Tarnier discusses the history of the prophylactic method, which gives such good results at present in comparison to the grave statistics of a period not long passed. He uses in his practice insoufflations of iodoform powder, as recommended by Dr. Valude (1), and which produces results rather better than those obtained from

(1) *Annales d'Oculistique*, Aug., 1891.

nitrate of silver, used according to Cr  d  's method. Iodoform does not produce the inflammatory reaction which is noticed after the instillation of a 2% nitrate of silver solution.

In the treatment of ophthalmia he adopts the classical treatment of frequent irrigations, and especially cauterization twice a day with a 2% or 3% solution of nitrate of silver, according to the intensity of the ophthalmia. For irrigation, the aseptic solution of thebaic extract (water, 1,000 gram.; thebaic extract, 10 centigr.). This liquid relieves the pain and has a favorable action upon the suppuration.

Other washes, especially permanganate of potash, tried quite recently, since the publication of an article by Dr. Kalt, have given unsatisfactory results. Permanganate of potash, especially, has produced harmful effects, and should not be used.—VALUDE.

R  tine des vert  bres, by Dr. RAMON Y CAJAL, translated by VON GREEFF. (168 pages, 7 pl. Wiesbaden, J. F. Bergmann.)

After having seen the same diagrams of the structure of the retina reproduced in all the treatises which have appeared in the last twenty years, the author has undertaken anew this delicate and difficult subject, the histology of the nervous system. The merit of this new effort is due, in the first place, to Dr. Ramon y Cajal, Professor of Histology in the Faculty of Medicine of Madrid. Thanks to the enterprise of the well-known Wiesbaden publisher, Mr. J. F. Bergmann, the interesting results of these researches have been included in seven folio plates of superior execution, and are accompanied with 168 pages of text from the pen of Dr. Greeff. The text is sufficiently full to explain the results represented in the plates. We recommend this work to all who are interested in the histology of the nervous system.—SULZER.

Sub-conjunctival Injections of Common Salt and Their Therapeutic Effects in Destructive Forms of Keratitis, by Dr. ARNOLD MARTI.

(*Des injections sous-conjonctivales de sel de cuisine et de leur effet th  rapeutique dans les k  ratites destructives. Thesis at Basle, 1894.*)

At the clinic of Professor Schiess, sub-conjunctival injections of sublimate have been in use since 1892, especially in keratitis; but serious difficulties have been found here as elsewhere in its use: at times, intolerable pain, and inflammation which may lead to necrosis of the conjunctiva, and which always results in obliteration of the sub-conjunctival space from extensive adhesions with the sclerotic, etc. Mellinger was able to reproduce these disturbances in rabbits, but with solutions of 1-4000, or of weaker strength, the inconveniences cease. So, quite as good results are obtained with small doses

of these weak solutions as with those advised by Raymond, Secondi, Darier, etc. He concludes that the efficiency of the injections is due to the action of liquid injected into the lymphatic circulation rather than to the disinfective action of the sublimate. Experiments with weak sterilized solutions of NaCl confirm his hypothesis. For a year these injections, ordinarily about 2%, have completely replaced those of sublimate at the clinic at Basle. Their good effects have been particularly noticeable in the destructive forms of keratitis, of which Dr. Marti reports 25 cases: 3 cases of corneal infiltration (not ulcerated), 8 cases of ulcerated keratitis in persons of different ages, 5 cases of ulcerative keratitis with hypopyon, and 9 cases of progressive infectious ulcer with hypopyon (*ulcus serpens*), all in aged people.

For several years destructive forms of keratitis have been treated by disinfection, moist heat, to which has been added, in serious cases, linear cauterization of the conjunctiva, after the method of Professor Schiess. The results, already superior to those of the actual cautery and keratotomy for *ulcus serpens*, have been very much improved by the addition of sub-conjunctival injections of NaCl, including arrested development of the disease, more rapid absorption of the infiltrate and exudate, of the hypopyon in particular, accelerated epithelial regenerations, cicatrization more favorable, perforation far more rare, etc.

By comparing the results of these 25 cases with 129 reported in the thesis of Fisch on linear canterization (Basle, 1884) the advantage is on the side of the salt sub-conjunctival injections. In one of the eyes, which was enucleated for glaucoma, some time after recovery from a corneal ulcer, it was found that the sub-conjunctival space where the injections had been made was intact.

The author explains the good effect of these injections by the extensive diffusion of liquid injected into the lymphatic cavities surrounding the eyeball (experiments of Staderini, Deutschmann, Mellinger), and by the absorption of harmful substances and the products of assimilation, and the separation of diseased portions carried along in the accelerated lymph current. Salt being hygroscopic, pumps, so to speak, the liquid from the cells and fibres of the neighboring tissues. Dr. Marti recalls the recent work of Heidenheim, showing that the formation of lymph in the circulation is very much increased by introducing sea salt into the blood current. The more active elimination of the elements of decomposition necessarily brings about a more active supply of new nutritive substances from the blood, which naturally results in a more rapid reformation of the changed tissues.

—HALTENHOFF.

The Use of Crude Petroleum in Conjunctivitis.

(*De l'emploi du pétrol brut dans les conjonctivites.* Thesis, Paris, 1894. By Dr. DUBAR.)

The author presents a review of treatment of conjunctivitis with crude petroleum, introduced into ophthalmology by his preceptor, Dr. Trousseau. He applies it confidently, as recommended by the latter, to all forms of catarrhal conjunctivitis, diphtheritic conjunctivitis, and the acute reactionary forms of trachoma.—DE BOURGON.

MEDICAL JOURNALS.

Several Cases of Scotoma, by Dr. DE SCHWEINITZ. (*Internat. Clinics*, Vol. III., 4th Series.)

The cases reported are as follows :

1. *Sub-acute glaucoma with semi-annular scotoma.*
2. *Interstitial neuritis* in a patient addicted to the use of alcohol and tobacco in excess, and who had had rheumatism and malaria, and possibly syphilis with *annular scotoma.*
3. Homonymous scotoma of the lower quadrant on the left ; later, lateral hemianopsia on the right, followed by restoration of the right superior quadrant. Finally, the visual field resumed its normal limit, but retained a large annular scotoma.
4. Unilateral central scotoma in a patient subject to transient albuminuria, possibly from the influence of hysteria.—DE BOURGON.

A Case of Retinitis Pigmentosa of Rapid Progress, by Dr. DEHOGUES. (*Revista de Ciencias Medicas*, 5 octobre, 1894, No. 19.)

The patient was a man forty-two years of age, in whom a retinitis pigmentosa was developed with extreme rapidity without being preceded by hemeralopia. The author thinks the disease was due to chronic alcoholism.—DE BOURGON.

The Therapeutic Value of Sub-conjunctival Injections of Sublimate, by Dr. K. RUMSZEWICZ. (*Przegl. Lek.*, 4, 5.)

Based upon his personal experiences, the author suggests the following as indications for the use of sub-conjunctival injections of sublimate :

1. Cases of accumulation of pus in the anterior chamber ; although the author admits that in certain cases this treatment is ineffectual.

2. Cases of infected wounds of the eyeball; here sublimate acts in a prophylactic or therapeutic manner.

3. Severe and obstinate cases of iritis, especially those accompanied with hypopia.

4. Scleritis.

5. The Choroiditis and retinitis of myopia.—MUTERMILCH.

Pseudo-Gumma of the Iris of Traumatic Origin, by Dr. WICHERKIEWICZ. (*Nowiny Lek.*, 1, 1894.)

The author reports a case of granuloma of the iris seated at the pupillary border and caused by a foreign body. This tumor, which greatly resembled a gumma, disappeared rapidly without antisyphilitic treatment.—MUTERMILCH.

Sub-conjunctival Injections of Sublimate in Sympathetic Ophthalmia, by Dr. B. WICHERKIEWICZ.

The author describes two cases of sympathetic ophthalmia recovering after injections of sublimate. It is important to add that besides the injections enucleation of the eye primarily affected was performed in two cases, and that many other therapeutic methods were employed.—MUTERMILCH.

Does Hysterical Nystagmus Exist? By Dr. SABRAZES. (*Semaine Médic.*, Sept. 26, 1894.)
(*Existe-t-il un nystagmus hystérique?*)

Tremor of the eyeballs, or *nystagmus*, may be congenital or acquired.

If *congenital*, it is combined with defective vision, infantile cataract, microphthalmia, coloboma of iris and choroid, ametropia, albinism, retinitis pigmentosa, or astigmatism.

If acquired, it depends upon either an ocular disease such as glaucoma, or, as it is seen in miners, upon spasmodic disturbances of the muscular system of the eye, from too great and too long sustained efforts of accommodation from defective illumination. It is not rare to see nystagmus appear in the course of some of the diseases of the nervous system, such as multiple sclerosis, the hereditary cerebellar ataxia, the ataxia of Friedreich, progressive muscular atrophy, syringomyelia, paralysis agitans, and epilepsy. Lesions of certain portions of the brain, the optic thalami, the cerebellum, and restiform bodies may also induce nystagmus.

But is acquired nystagmus, the diagnostic value of which I am about to sketch, always produced by a permanent organic lesion? May there not be cases in which the successive eliminations of the

many causes cited to explain nystagmus lead the observer to suspect the possibility of a purely functional disturbance arising from hysterical phenomena?

This is not the opinion of neurologists, and particularly of Charcot, who said in 1892, in the course of a lecture on multiple sclerosis and its ocular phenomena: "Nystagmus is never found in hysteria or in tabes."

But the existence of a single indisputable case, carefully observed, suffices to controvert this too strong assertion and to show that an hysterical nystagmus may really exist.

The author confirms his assertion by reporting a case of manifest hysteria where the nystagmus was independent of any lesion of the visual apparatus. Furthermore, hypnotic suggestion caused the disappearance of all symptoms of disease as soon as it was practised.

Nystagmus should not, then, be taken as an absolute proof of multiple sclerosis without considering the possibility of hysteria.—
VALUDE.

A Case of Hordeolum Terminating in Death, by Dr. LESNIEWSKI.
(*Gazeta Lekarska*, No. 18.)

The case reported by the author relates to a man twenty years old who had had a sty on the lower lid of the right eye for several days, and who was suddenly seized with a severe chill, followed immediately by a marked œdema of the forehead. The condition of the patient continued to grow worse, and he entered the *hôpital de l'Enfant-Jesus* during the service of Dr. Jawdyski, when quite an intense fever was found, with loss of consciousness; the lids of the right eye, the forehead, and the root of the nose were œdematous, and the œdema spread to the left half of the cranium. The eyeball and conjunctiva showed no signs of trouble, râles were heard in the lungs, and the general bad condition of the patient increased. At the lower border of the right lid a small scar was seen, near the internal angle of the eye. After shaving the hair about the œdematous epicranial region deep red streaks were found corresponding to the course of the veins, forming a network at the top of the head. In several parts of this network softening and fluctuation were found, while in others the streaks felt like hard cords. This was, then, a phlebitis of the frontal veins, which had arisen from the seat of the sty and had spread to the cerebral sinuses and produced pyæmia.

Incisions made along all the dilated veins of the forehead and cranium gave issue to a yellow, thick, non-fetid pus, and the suppuration

was found to have invaded the surrounding tissue as well as the vessels. All the wounds were carefully irrigated with a sublimate solution, and an antiseptic dressing applied, but the patient succumbed to the general weakness.

The autopsy confirmed the diagnosis made during life. Suppuration of the two cavernous sinuses was found, while the other cerebral sinuses contained liquid blood, a fact which showed the course of propagation of the pathological process to have been the ophthalmic vein, and not the veins of the cranium which communicate with the superficial sinuses. On removal of the eye the ophthalmic vein was seen to be completely filled with pus, and one of the suppurating veins could be traced to the root of the styte. The lungs contained several metastatic abscesses.

Pus obtained with proper precautions at the time of the operation produced cultures of yellow pyogenic staphylococcus. There was then no secondary infection. The same germ which is constantly found in abscesses in general, and especially in hordeolum, had caused the primary trouble (the hordeolum), and its consequence (phlebitis).

From the study of this case Dr. Lesniowski is led to affirm that any one with a trouble even so slight as a styte may be exposed to the most serious infectious complications.—*From Semaine Méd.*

A Case of Operation for Congenital Cataract, by Dr. VAN DEN BERGH. (*La Presse méd. belge*, Oct. 28.)

The patient was a child four years of age with a complete congenital cataract with good projection. The mother also had a congenital cataract. Extraction was performed according to the simple linear method of Von Graefe, as there were calcareous deposits in the lens and a commencing absorption which rendered discision as well as aspiration improper. Indeed, according to the author, it is not always proper to rely upon aspiration in cataracts of infancy. A hard nucleus is frequently found when it is not expected, and complications may follow, the least of which is the ill success of the operation. The same is true of discision. Dr. Van den Bergh remembers an operation for discision attempted in his presence, and which could not be completed because of the hard condition of the lens. The needle dislocated the lens into the anterior chamber, and the child lost the eye. As the consistency of a cataract is never absolutely certain, it is better to have recourse to a process which offers security in all respects.

The operation was then performed according to the method of Von Graefe. A number of softened masses were extracted, and there remained in place a thick sac which it was impossible to tear. Dr. Van den Bergh then introduced a capsular forceps and drew out the whole capsular sac. The same manoeuvre was successfully accomplished on both sides, not an easy thing when the iris is left intact. After the operation the pupils were round and quite black. Recovery followed without complications, and the child enjoys good vision.—VALUDE.

A Second (1) Case of Ocular Diphtheria Treated by Serotherapy, by Dr. H. COPPEZ. (*Journ. de méd. et de chir. de Bruxelles*, Nov. 24.)

A detailed description is given of this case to emphasize the special character of the stage of repair following the injection of serum.

The false membranes, says the author, disappear more or less rapidly and leave behind them healthy tissue. There is no period of supuration or repair. The disease is cured at the outset. The disappearance of the false membranes takes place in inverse order to their appearance. "They seem to melt like a snowflake in a ray of sunlight," is the picturesque expression of Professor Coppez, or, in more scientific terms, they seem to disappear by a process similar to that by which they came.

It is superfluous to dwell longer on the important rôle played by serotherapy in the treatment of ocular diphtheria. Thanks to the injections of antitoxine, we are henceforth in a fair way to check the invading progress of pseudo-membranous exudates. Better still, the last two stages of the malady may be suppressed, with all the dangers that accompany them. In short, with this new treatment, when the false membrane has once disappeared the disease itself is conquered. If treatment is begun at the proper time it will not be forty-eight hours before all the menacing symptoms have disappeared, and the physician will be gratified by the rapid and complete recovery.—DASTOT.

Old Foreign Body in the Eye, by Dr. LAGRANGE.
(*Annales de la Polyclinique de Bordeaux*, Nov.)

The author reports a case of a foreign body encapsulated in the ciliary region which remained in place for seven years without producing any sympathetic disturbance or local irritation. There was a total detachment of the retina, dating from the time of the acci-

(1) See the description of the first case, *Annales d'Oculistique*, Nov., p. 341.

dent. The patient asked him to remove the eye, not because it was a menace to the other, or because it was itself painful. No symptom of irritation has appeared since the accident.—VALUDE.

Formol in Ophthalmology, by Dr. GUAITA.

(*Lo Sperimentale*, No. 33.)

The author refers to the article by Valude (1) in which he first called the attention of oculists to formol and explained its special properties. Its essential quality is to maintain the medium which contains it, even when in extremely minute quantity, indefinitely aseptic. The most convincing experiment cited by the author is the almost indefinite preservation of a piece of meat under a glass simply exposed to the vapor of formol. Dr. Leber, probably influenced by this fact, made a happy application of it by using formol for the preservation of laboratory specimens, and his communications on the subject to the International Congress at Edinburgh, 1894, attracted much attention.

Dr. Guaita repeated the clinical experiments of Valude, which he confirms in every point. The solution employed was 1-2000, stronger solutions being irritating and decidedly painful. In suppurative keratitis, formol has given very good results, because of its remarkable power of diffusion. In trachoma, this substance is shown to have a curative action quite superior to sublimate in rapidity and efficiency.

In brief, according to the author, formol is a substance whose sterilizing action is of much interest, and its use in ophthalmology should be extended.—VALUDE.

Bi-focal Glasses, by Dr. AUBERT.

(*Lyon méd.* Dec. 2.)

The author states that bi-focal glasses should be more commonly used than they are, as for near vision a very small surface of glass only (1 centimetre) is required; the remainder of the glass is suitable for distant seeing.—VALUDE.

Sensory Disturbances of the Eyeball and its Adnexa in Locomotor Ataxia, by Dr. E. BERGER.

(*La Médecine moderne*, Nov. 21.)

Since Dr. Knies, in his treatise on the relations between general diseases and ocular disturbances, drew attention to sensory disturb-

(1) *Annales d'Oculistique*, July, 1893, p. 19.

ances of the eyeball and its adnexa, observations in this direction have become more and more numerous. Dr. Berger here reports five new cases, from which he draws the following conclusions:

I have observed that in locomotor ataxia quite varied sensory disturbances may develop in the eyeball and its adnexa.

In the cornea this disturbance consists of diminished sensitiveness of this membrane, touch producing no lid reflex. There is, besides, a false localization of sensation. Touching this membrane is localized in the corners of the eye.

In the conjunctiva I have noticed a partial anæsthesia to touch, and a false localization of sensation.

The skin of the lids also shows symptoms of false localization.

There may be a periorbital anæsthesia and false localization of sensations in the skin of the forehead, the temple, the cheek, and the nose.

Although my investigations of sensory disturbances of the organ of sight have not been extensive, I am inclined to think:

1. That there is no relation between their presence and that of an optic atrophy of ataxic origin. There are, indeed, cases of which I have had several convincing examples, in which there is optic atrophy of ataxic origin without sensory disturbances of the eyeball or its adnexa, and other cases where all these disturbances have been found in tabes and without optic atrophy.

2. I think that in a case of optic atrophy where sensory disturbances and false localization of sensation, such as I have described, are found, their presence is a strong presumption in favor of a tabetic origin of this atrophy.

It is superfluous to lay stress upon the importance, from a diagnostic standpoint, of investigating these sensory disturbances in dubious cases.—SULZER.

**History of an Epidemic of Ophthalmology in a School, by
Mr. SNELL.**

(*Brit. Med. Jour.*, Nov. 17, 1894, p. 1104.)

Epidemics of ophthalmia have been observed in English schools frequented by children of the poor and the laboring classes.

But this is the first report of such an epidemic occurring in an institute well known in England as one where the hygienic conditions are of the best and the social position of the scholars leaves nothing to desire. The form of the disease was a benign follicular conjunc-

tivitis. The first cases were sporadic, and gave no trace of the origin of the invasion. Teachers, as well as the scholars, were sufferers.

The follicles were found almost exclusively on the lower lid, rarely extending into the cul-de-sac. The upper lids were very rarely attacked. When this did happen the epithelial covering appeared roughened, as though scratched or covered with fine dust.

Of 102 persons connected with the school, examined at different times, 13 only remained exempt. The servants who were employed in the dormitories were attacked, while those employed in the kitchen were not. Everything indicated that the infectious agent was localized in the dormitories.

The author proposed that the scholars should be sent back to their families. Those affected with ophthalmia should take a certificate stating the condition of their eyes and that they should not be admitted into any educational institution before their complete recovery. Mr. Jonathan Hutchinson, who was also consulted, was of a different opinion, fearing that the scholars would become centres of infection in their new surroundings. This view was adopted by the committee. Necessary measures were taken to isolate the patients in a house rented for this purpose and situated on the sea-shore. The best results were obtained, but recovery was very slow. In spite of every attention, the disease continued for several months.

This epidemic presents several interesting points in the pathology of follicular conjunctivitis. All the cases recovered with no trace of a scar. No case degenerated into trachoma. More than half of the pupils affected were withdrawn from the school during the Christmas vacation (the epidemic had broken out in August) while the ophthalmia was still in progress. The author had the opportunity of following up many of the cases, and can affirm that not one of them communicated the disease to others. The most rigorous measures to remove the contagion from the institute itself were ineffectual. It seemed that the infectious agent came from the walls of the building, and that contagion played no part in the propagation of the disease.—SULZER.

Tabetic Amaurosis, by Dr. HUSEMANN.

(*Deutsche Med. Wochenschr.*, Oct. 25, 1894.)

For some time past there has been observed in Australia, in that part of New South Wales traversed by the river Darling, an epizootic amaurosis among horses. The territory invaded by this disease

spreads more and more in a southern direction, and in some districts, especially in the neighborhood of Wilcannia and Wentworth, 25% of the horses are totally blind.

The disease manifests no inflammatory symptoms. Changes in the spinal cord and choking of the atrophied optic nerves are found.

The author shares the view of the Australian veterinaries, who attribute the disease to the toxic effects of Australian tobacco (*Nicotiana suaveolens*). This plant has spread for several years past in the districts ravaged by inundations.—SULZER.

Sub-conjunctival Injections of Sublimate, by Dr. GROSSMANN,
(Budapest). (*Pester medic. chirurg. Presse*, 1894, Nos. 27 and 28.)

Dr. Grossmann is high in his praise of sub-conjunctival injections of mercury, performed according to the directions of Abadie and Darier. He describes a series of cases in detail in support of this form of medication, which he considers a great advance in ocular therapeutics. These injections have been employed without any serious complications in the following diseases :

1. Post-operative and traumatic infections.
2. Ulcerative keratitis.
3. Gummatous, granular, and rheumatic iritis.
4. Infectious iridochoroiditis.
5. Retrobulbar and infectious optic neuritis.
6. Optic neuritis of unknown origin.—SULZER.

Diphtheritic Conjunctivitis, by Dr. UHTHOFF.
(*Berliner klin. Wochenschr.*, 1894, No. 34.)

Bacteriological examinations show that the gravity of pseudo-membranous conjunctivitis does not depend on the presence or absence of the bacillus of Klebs. This has been found in great abundance and in a virulent form in several cases of croupous conjunctivitis—that is, false membranes less exuberant than the diphtheritic membrane. As the result of his personal researches, the author is in complete accord with the conclusions of Sourdille and Morax.—SULZER.

V.—ITEMS.

Necrology.—Dr. Sichel, Jr., oculist, Paris.

Faculty of Medicine of Vienna.—Dr. Schnabel, professor in the German Faculty of Medicine in Prague, has been named as Professor of Ophthalmology in the place of Dr. Stellwag von Carion, retired on account of age.

MISCELLANY.

CORRESPONDENCE.

(Open letters to the Director of *Annales d'Oculistique*.)

CONCERNING THE TREATMENT OF PURULENT OPHTHALMIA.

MY DEAR COLLEAGUE :

In the discussion which took place at the Ophthalmological Society of Paris (see December number, p. 400) on the communication of Dr. Kalt concerning the *Treatment of Ophthalmia in the New-born*, I did not speak, through fear of not being able to express my thoughts without offence to my colleague. I did not criticise the quotation which he made from the thesis of my pupil, Dr. Morax, although it was not quite correct. Encouraged doubtless by my silence, Dr. Kalt now presents a new rendering, which quite misrepresents that paper. I find these words in the Proceedings, as reported in *Annales d'Oculistique*, December 1894, p. 416 : "I have stated that it has not been the custom with us to publish statistics of corneal complications. It is only that here and there a *serious failure* is noted, attributed to some entirely different reason. Morax, in his thesis written under the direction of Dr. Parinaud, cites two cases of ophthalmia following vulvitis, in two young women treated from the first twenty-four hours. In one case there was perforation, and in the other corneal infiltration."

There were not two cases of ophthalmia following vulvitis described in Dr. Morax's thesis, but six.

In one case (Case XVI.) there was indeed perforation. But it is important to know that *corneal lesions existed before treatment*, and that, in spite of a peripheral perforation of the cornea, the eye was preserved with good vision. It was also stated in the report of this case that there had been a traumatism of the eye, and that in putting the hand to the eye after the traumatism the patient, subject to vulvitis, probably brought about the contagion. I think that my

experienced colleagues will find that this so-called failure was, in fact, a success.

In the second case (Case XVII.) it is stated :

"On July 25 a slight corneal infiltration appeared, but disappeared rapidly under treatment. August 1, recovery was complete, and there remained no ocular lesion."

These are what Dr. Kalt quotes as *serious failures* ! Furthermore, it is not proper, in considering the gravity of these cases, to compare ophthalmia following vulvitis with ophthalmia of the new-born.

DR. PARINAUD.

THE EDITOR-IN-CHIEF.

DEAR SIR :—Will you kindly insert in your next number several observations on the subject of the treatment of purulent ophthalmia by irrigation ? (Dr. Kalt's communication. See above.)

I am surprised to find that Dr. Kalt considers himself the first person in France to recommend the substitution of antiseptic irrigations for canterization of the conjunctiva in purulent ophthalmia. It is well known that this was the practice of Chassaignac.

Some time ago I endeavored to discover a form of treatment for ophthalmia more simple and efficacious than the use of nitrate of silver. The results of my investigations were consigned to a little pamphlet which appeared at the beginning of last year. (*Traitement de la blennorrhagie par l'irrigation antiseptique discontinue*, Rueff édit., Paris, 1894.)

I finally adopted, for the conjunctiva, the practice of intermittent irrigations with weak non-irritating antiseptic solutions. The success of such injections, whatever was the antiseptic used, has been noticeable in urethral blennorrhœa, provided the antiseptic was used in a solution weak enough to avoid painful reaction. Sublimate in a solution of 1-30,000 to 1-10,000 produces marked results in the urethra. In 1882 and 1883 I employed irrigations of permanganate of potash for the urethra and bladder, but have abandoned permanganate for sublimate, which gives, in solution of proper strength, quite as rapid results, and has not the disadvantage of soiling the linen.

For the conjunctiva I have used bichloride of mercury in solutions varying from 1-10,000 to 1-5,000, and Labarraque's solution, 1-50 to 1-20. Labarraque's solution, which Roux also recommends in diphtheria as the best local treatment to use in conjunction with injections of serum, has the advantage over sublimate of not coagulating pus and of having a solvent action on mucous secretions. This property

of Labarraque's solution is due to its strong alkalinity. It is furthermore in solution of 1-20 two and a half times more antiseptic than sublimate solution 1 5,000, and is also much better tolerated by the conjunctiva.

It would seem, in the light of the Proceedings of the Ophthalmological Society (see *Annales d'Oculistique*, December), that if the advantage of irrigation of the conjunctiva in purulent ophthalmia is so much questioned, it is because it has been used without sufficient consideration of the real antiseptic value of the caustic liquids, a subject which I have carefully studied in my private laboratory.

These irrigations—and I quite agree with Dr. Despagne (see the Proceedings)—cannot be generally employed if one is confined to the use of apparatus such as those of Kalt, Lagrange, etc.

A simple method is necessary, less costly, and within the means of all. I think these conditions are realized in a method which I have employed for a long time, and which I published in my little pamphlet, conjointly with the treatment of ophthalmia.

I employ a rubber bulb, holding from 150 to 200 cubic centimetres, furnished with a stiff canula of red rubber.

Irrigations are made every half-hour in severe cases. The bulb is filled with antiseptic liquid at a temperature of 37° or 38° (C.), and the canula, covered with vaseline, is introduced under the lower lid and then under the upper lid. The treatment is not painful. I have seen children undergo irrigations without even waking from sleep, and have delegated its use to mothers in poor families, without any precautions, in the treatment of most serious forms of purulent conjunctivitis complicated by corneal ulcerations, with the most successful results.

I have superintended the treatment twice a day, and I have been surprised to find, as soon as the lids of the child could be opened, with what rapidity the corneal ulcers have healed, leaving scarcely a trace after a few months.

As my publication passed unnoticed, I think that the attention of your readers should be called to it, and if there is a question of priority in the re-establishment of an old method, abandoned from want of rational application, this priority certainly belongs to the simple and methodical treatment to the results of which I have referred.

Very respectfully,

DR. E. DOREN (Rheims).

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

THE USE OF CONVEX GLASSES FOR DISTANT VISION IN MYOPIA

By Drs. **L. DE WECKER** and **J. MASSELON.**

We propose to discuss the advantage to be gained in certain cases of myopia from the use of convex glasses for distant vision. Although this seems at first paradoxical, it is unquestionably true that myopes succeed in considerably increasing their sharpness of vision and are enabled to read characters at a distance which they could not distinguish with concave glasses, such, for example, as the name of a street or the number of a house, by placing at some distance in front of the better eye a convex glass, as they would use a lorgnette. The inconvenience of this procedure is in the fact that an inverted image is obtained; but with a little practice inverted characters are easily read, and the facts prove conclusively that this inconvenience is amply compensated for by the increased size of the image, since we know of myopic persons who make habitual use of such glasses.

The method of employing convex glasses in myopia consists in placing the glass before the eye at such a distance that its focus coincides with the *punctum remotum*. If the myope completely relaxes his accommodation, as he must do under other circumstances, he finds that with the aid of this convex glass

the eye is adjusted for parallel rays and can see at a distance. An inverted image is thus obtained, just as the ophthalmoscopic observer receives an inverted image of a myopic eye when, withdrawing from the eye under examination, he adjusts for the *punctum remotum* of the observed eye, either by the aid of his own accommodation or by the use of a convex lens.

The amount of enlargement of the images of objects observed depends on the amount of myopia and the focus of the convex glass employed. With a given convex lens, the image is enlarged in proportion as the degree of myopia is higher. On the other hand, in equal degrees of myopia the amplification of the image increases with the use of weaker convex lenses. The use of weak convex lenses, in high degrees of myopia, to obtain considerable enlargement, is thus rendered impracticable by the fact that it is necessary to hold the glass at quite a distance from the eye, and the image is so enlarged that the field of vision becomes contracted and a slight movement of the hand which holds the glass results in the disappearance of the object observed.

Practically, glasses weaker than 5 dioptries cannot be employed, and it is desirable that they should be 5 or 6 centimetres in diameter. Under these conditions, the myope, with a little practice, can easily see the objects which he desires to observe, and the visual acuity will be found to be more than double that which is obtained by correcting the myopia with a convex glass, as we have recently had occasion to observe in a case of a person with myopia of 20 dioptries who had accustomed himself to the use of a convex lens.

It will be noticed that with convex lenses a phenomenon occurs exactly opposite to that which is observed in a myopic eye supplied with a concave lens, as in the latter case objects appear diminished in size (a fact which persons having both a myopic eye and an emmetropic or a hypermetropic eye can easily prove); on the other hand, if the myopia is corrected with a convex lens there is an enlargement of the image, and if the convex lens employed is suitable, the advantages are far superior to those obtained with spectacles.

In conclusion, we think it would be advantageous to extend

the use of convex glasses to many cases where, with a high degree of myopia, the visual acuity is defective. Glasses of about +6 dioptries should be prescribed and used like the magnifying glass which certain people use for reading; they thus constitute a magnifying glass for distant vision. Since these glasses produce an inverted image, they are to be used only occasionally, when the myope wishes to see with precision small objects, such, for example, as a public notice, the name of a street, or the number of a house. In these special instances convex lenses will be regarded by certain myopic persons as quite superior to concave lenses, and they will be thankfully accepted as a valuable expedient.

Having had the opportunity of discussing this optical question with Dr. G. Poullain, our colleague desires to add the following note to our communication :

“I have made similar experiments,” says Dr. Poullain, “and have been able to increase the visual acuity in several cases of myopia of a high degree; I have also made some attempts at obtaining an erect image.

“I at first attached a convex lens to one of the faces of the right angle of a rectangular prism, and by looking through the other face of the prism, held at a fixed distance from the eye, I was able, on making myself myopic, to see objects erect, but with this inconvenience, that the right side of the object was seen at the left, and *vice versa*, for the total reflection on the surface of the hypotenuse only caused the image inverted by the lens to be erect in the plane perpendicular to the faces of the prism.

“I then made the experiment of fastening two prisms together by one of the right-angle faces in such a way that the edge of one prism was perpendicular to the edge of the other. In this way the image of the object underwent the double erection required. Instead of attaching a convex lens to the incident surface only, I attached one also to the surface of emergence, the refraction of the two lenses being equal to that of the single lens of the first experiment; in this way either face could be used as the incident surface. But with this apparatus,

only objects situated at the right or left could be seen, and considerable experience was necessary in order to make use of it. I preferred an arrangement similar to that of Porro's telescope.

"Half of the hypotenuse face of a right-angled prism was attached to half of the same face of another right-angled prism. On each of the free portions of the hypotenuse faces was attached a lens of $2\frac{1}{4}$ dioptries, and by placing this biprism at a proper distance—that is, such that its focus was at the far point of the myopic eye—objects appeared *erect* and *enlarged*.

"Other things being equal, the field increases as the square of the face of emergence, and the weight of the biprism varies as the cube of the same side. This consideration raises an obstacle to the use of such a biprism: if it is too small the field will be too limited, and if it is large it will be too heavy.

"I have lately found the experiment on which this communication is based in the Optics of Kepler, Proposition LXXVIII. This scientist, who had a myopia of high degree, without doubt found in his own case this peculiarity of a myopic eye, and I am inclined to think that it was the origin of the invention of his astronomical telescope. He understood that, to place a normal eye in the condition of his own, it sufficed to add to that eye the refractive power which he had in excess.

"In conclusion, I desire to call attention to the phenomena which occur in a hypermetropic eye under similar conditions—that is, in looking through a lens a number of dioptries less than the measure of his own amétropia and placed at a proper distance from the eye. Under such circumstances, the hypermetrope sees objects *enlarged* and *erect*, thus simulating Galileo's telescope, as in Kepler's experiment the excess of refraction of the myopic eye replaced the convex ocular of the astronomical telescope."

FORMOL IN THE TREATMENT OF PURULENT OPHTHALMIA

By Dr. **FROMAGET**,

Chief of the Clinic of the Faculty of Medicine at Bordeaux.

The recent discussion which has taken place at the Society of Ophthalmology of Paris concerning the communication of Dr. Kalt encourages me to publish here the results which I have obtained in treating a number of cases of purulent ophthalmia with formol.

The most serious objection which can be made to Dr. Kalt's work is that none but children with an ophthalmia of several days' duration have come under his care, since, according to his statement, "60% have not received proper attention until after the eighth day—that is, at a time when, in a grave ophthalmia, the cornea is often implicated," and "especially at a period when the ophthalmia is bound to decrease under any treatment whatever" (Valude).

The cases which I report here have been treated by me from the onset by a single method. I publish them such as they are.

Formol, the antiseptic qualities of which have been accurately established, and which was first recommended in ophthalmology by Valude, has been employed by me in two ways: as a collyrium in the proportion of 1 to 200, and as a wash, 1 to 2,000.

After carefully bathing the palpebral and bulbar conjunctiva with a solution of 1 to 2,000, I instil several drops of the collyrium.

The irrigations and instillations are performed four times a day.

I have used no irrigator, and am convinced that every oculist can cleanse the cul-de-sacs quite as well with his fingers and an ordinary elevator as with any irrigator whatever.

I had already used formol successfully in cases of catarrhal conjunctivitis, and have now submitted the new-born children from the obstetrical clinic of the Hôpital Saint-André who have required my attention to this treatment.

First of all, I will report the cases :

Case I.—Marcel L——, eight days old, was attacked five days after birth with a purulent ophthalmia in the left eye. (Maternity Department of the Hôpital Saint-André.)

The disease had already existed three days when the child was brought to the ophthalmological clinic. Treatment with formol (irrigations and instillations) was commenced on August 7, 1893.

On the 11th, there was considerable improvement. The cornea was not ulcerated, and was scarcely affected. Absolute recovery without corneal lesion on August 16—that is, after nine days.

Case II.—Catherine L——, five days old, was brought for consultation on September 14, 1893.

Purulent ophthalmia of twenty-four hours' duration. .

Irrigations and instillations of formol.

Complete recovery after a few days.

Case III.—J. F——, born October 19, 1893, was brought twelve days after to the ophthalmological clinic for a purulent ophthalmia of six days' duration. The corneæ were not ulcerated. Abundant suppuration. Marked chemosis. Treated with formol, and recovery was complete in eight days (October 31 to November 8, 1893).

Case IV.—André L——, born October 18, at the Saint-André Maternity; was brought for consultation with a purulent ophthalmia of two days' standing. No corneal lesions; recovery in eight days.

Case V.—Joseph X——, five days old, was attacked December 9, 1893, with a purulent ophthalmia in the left eye. On the 12th, he was brought to Professor Badal's clinic. The inflammatory phenomena were very intense, but the cornea was intact.

Treatment with formol brought about much improvement after the first three days. On the twelfth day, every trace of purulence had disappeared. There remained only a slight catarrh.

Recovery in twelve days.

Case VI.—Charles B——, four days old, attacked the day before with purulent ophthalmia in the right eye. Lids œdematous and red; conjunctiva swollen; chemosis.

No corneal lesions.

Recovery in ten days (January 13 to 24, 1894).

Case VII.—Marie J——, four days old, was brought from the Maternity to Professor Badal's clinic with a double purulent ophthalmia of twenty-four hours' duration.

Marked improvement at the end of three days.

Recovery without corneal lesion in seven days.

Case VIII.—Jean L——, five days old, brought from the Saint-André Maternity on March 19, 1894, for a purulent ophthalmia of twenty-four hours' duration. Slight inflammatory phenomena. No corneal disturbance.

Recovery under formol in eight days.

Case IX.—Fernand Fl——, born July 31, 1894, at the Saint-André Maternity, was brought to Professor Badal's clinic on August 7 for a purulent ophthalmia of the right eye.

The disease had commenced only twenty-four hours before, and no serious lesion existed; the symptoms of inflammation in the lids were as yet slight; no corneal disturbance.

Treatment with formol commenced on August 7.

On the 9th, improvement was quite marked; the pus was thinner and more yellow; the lids were not so swollen nor so red.

Rapid improvement set in, and on the 16th of August recovery was complete without the slightest corneal trouble.

Recovery in nine days.

Case X.—N——, No. 431,975 of the register of the ophthalmological clinic, five days old, was presented September 27, 1893, for a double purulent ophthalmia, which had commenced twenty-four hours previously.

Abundant greenish thick pus. Chemosis; no corneal lesions.

Treatment with formol was energetically applied, and all the inflammatory phenomena receded after the third day, and the little patient left the hospital October 9, 1893, after twelve days' treatment.

The ten patients whose cases I have summarized were treated with formol from the onset. No accident occurred, and in no case was the cornea attacked.

The following cases, in which the treatment with formol was applied at a later stage, also resulted favorably, although nitrate of silver and sublimate irrigations had not retarded the progress of the disease:

Case XI.—L——, Jean, fifteen days old, was attacked with purulent ophthalmia three days after birth. (Saint-André Maternity.)

During the first twelve days of the progress of the disease the child had been treated at the Maternity with instillations of nitrate of silver. On the 2d of August, 1893, he was brought for consultation to the ophthalmological clinic. The lids were œdematous, the chemosis was enormous, and the purulent secretion very abundant. Irrigation with formol was immediately commenced, and instillations of the collyrium 1 to 200.

On August 5 the child was much better; the palpebral œdema had disappeared, and the chemosis was much reduced. The pus retained the same character (thick, yellow), but it was less abundant.

On the 7th, the pus, which had become very clear, was hardly noticeable.

On the 10th, recovery was complete, only a slight catarrh remaining.

The treatment lasted ten days.

Case XII.—D——, Henri, ten days old, treated for five days at the Saint-André Maternity for a purulent ophthalmia with instillations of nitrate of silver and irrigations of sublimate.

September 12, 1893, irrigations and instillations of formol were commenced.

Decided improvement after eleven days of treatment.

Case XIII.—Ludovic X——, born February 24, 1894, at the Saint-André Maternity, was attacked with double purulent ophthalmia on February 27.

When he was brought to the ophthalmological clinic, five days later (March 4), it was found that besides the intense inflammatory symptoms in the lid, there existed marked corneal disturbances on both sides. Further, the right cornea presented a large ulceration (2 to 3 millimetres).

Treatment with formol was immediately commenced, and from that day the corneal lesions ceased to increase, and gradually tended to recovery.

In nine days (March 13) the purulent secretion had disappeared, and seven days later (March 20) the ulceration had cicatrized with a slight leucoma.

Recovery in nine days.

The first conclusion which I would draw is that :

Treatment with formol has afforded notable results.

All the children treated by me at the Maternity recovered, and where corneal lesions already existed they did not increase.

Can it be said that the use of nitrate of silver would not have produced as good results? By no means; indeed, I am persuaded that it would have acted in the same way. But to acknowledge that the results produced by formol can be compared to those of the nitrate is to affirm at the same time the value of formol.

I also treated a young girl seventeen years of age attacked with purulent ophthalmia with formol. The disease was hardly twenty-four hours old, and the results were very satisfactory.

It was not successful, however, in two cases of blennorrhœic ophthalmia in adults. These two patients lost their sight from complete ulceration of the cornea with perforations. These are the two failures which I have to record.

These last results are certainly not brilliant. But it is to be admitted that in spite of the most energetic treatment with nitrate of silver eyes are not infrequently lost, and that speedily. The most serious purulent ophthalmias are those of blennorrhœic origin observed in adults, while the majority of ophthalmias of the new-born are far more benign.

I am convinced that formol is an excellent antiseptic.

It is preferable to sublimate, which rusts the instruments, and is, as the majority of oculists find, harmful to the cornea. Phenolic acid cannot be used. Boric acid possesses hardly any antiseptic power, and its use is disappointing.

Nitrate of silver in solution is very rapidly altered by light and by contact with instruments.

The action of permanganate is, in my opinion, far from satisfactory.

Formol is not altered by light, it does not rust instruments, it is antiseptic, and presents but a single disadvantage, that of being painful in strong solution—for example, 1 to 200. But in proportion of 1 to 2,000 it is well borne, and produces no pain.

If, now, we were to make deductions, they would be as follows :

Nitrate of silver remains the leading antiseptic in purulent ophthalmia; it should be used in the solution 1 to 30, or in the crayon, and the cauterization should reach the conjunctival folds.

These applications should be made by *experienced hands*, through fear of causing corneal ulcerations which might open the door to infection.

But, in addition to cauterization, it is useful and *necessary to employ conjunctival irrigations*, and there is need for an adjunct to nitrate of silver, which I think we have found in formol.

Besides cauterization with the nitrate, instillations and irrigations, performed with or without an irrigator, will be found of advantage.

Formol is sufficient to cure ophthalmia of the new-born; nitrate of silver also gives excellent results. By combining these two we are sure of obtaining a satisfactory success.

In all cases where patients cannot be treated by practised hands, it is far better to have recourse to formol alone, which can lead to no accident, than to allow applications to the conjunctiva of solutions of nitrate of silver, because of the danger of destruction of the corneal epithelium.

Treatment of purulent ophthalmia with formol has also been tried in the service of Dr. Lagrange at the Hôpital des Enfants, and the results published in the thesis of my old pupil, Dr. Olivier (Bordeaux, 1894), confirm the results which I have obtained at the clinic of my preceptor, Professor Badal.

As at the present time an auxiliary, if not a successor, to nitrate of silver is being sought, I have thought it well to publish these results, which are brilliant enough to encourage perseverance in this treatment. I think that something may be added to without detracting from the excellence of the old method.

For every microbial affection, two aims must be realized: the destruction of the infectious agent and the defertilization of the media where it lives, to prevent those which have escaped the action of the microbicide from living and from multiplying.

Nitrate of silver is the best microbicide; formol, as the

work of Valude and Dubief shows (*Annales d'Oculistique*, July, 1893), is a most excellent defertilizer; it is therefore the proper agent to complete the therapeutic work.

The combination of these two agents can produce only the best results.

FALSE LENTICONUS

By Dr. **L. DEMICHERI**, Chief of Clinic of Dr. de Wecker.

False lenticonus is that difference between the refraction of the nucleus and that of the cortex of the lens which exists at the commencement of cortical cataract, and which, without careful attention, might be mistaken for lenticonus.

In this article I shall only consider the variety of cataract called cortical, or nucleolar, the most frequent variety, and that in which the opacity commences in the cortical layers nearest the nucleus (Foerster). The more advanced the age of the patient, the more frequently are the layers nearest the nucleus the first to show the signs of change.

The first indication of the commencement of cataract is frequently given by the appearance of an irregular astigmatism, arising from the peculiar change which is going on in the constitution of the lens.

At the very onset, when no opacity of the lens, or at least a very slight one, exists, a diminution in sight may be noticed, which bears no relation to the degree of loss of transparency of the refractive media, but which is easily explained by the refractive changes in the eye in which it exists.

It is this condition of the lens, quite well known, which I wish to study in a more careful manner than has been previously done, with the aim of showing how guarded one should be in making a diagnosis of lenticonus.

I wish also to attempt to solve a question which has not greatly attracted the attention of classical writers—myopia dependent on cataractous changes (1).

I have observed two kinds of myopia in the case of a commencing cataract. A myopia exclusively central, which may reach a high grade, but which is accompanied by a peripheral hypermetropia (false lenticonus). The second variety of myopia is, from the clinical point of view, different from the first, as we cannot demonstrate an appreciable difference in refraction between the central and peripheral portions of the lens, and also because it is usually of a lesser degree than in the first variety.

We shall see directly that these two kinds of myopia are induced by the same cause, and that if there is a clinical difference, it is easily explained. It depends on a knowledge of what layer of the cortical mass is affected.

This article is founded on a series of cases which I have observed at the clinic in the Rue du Cherche-Midi. I shall describe one case in detail, because I think it is the first time that catoptric images of the nucleus of the human lens have been demonstrated. Besides, it is the classical and invariable description of false lenticonus.

M. B——, fifty-six years of age, merchant, came for consultation on December 5, 1894, on account of a diminution of sight in both eyes, which had been increasing, according to the patient's statement, for three years in the left eye, and for a still longer time in the right.

Objective examination showed no change in the exterior portions of the eye. The cornea was of regular curvature, and the keratoscopic image showed no change in any part of its extent. The anterior chamber was of normal depth.

(1) Myopia produced by cataract (so favorable for near vision, since it counterbalances presbyopia) was observed by early writers (Walthers, Scarpa), but it was Critchett the elder who called attention to this subject, which had fallen into oblivion (Heidelberg Congress, 1875). As to the grade to which it may extend, it is not generally indicated by these authors, or it is far below the actual facts (2 dioptries). The most accurate figures are those which were given by Drs. de Wecker and Masselon some time ago—that is, 6, 8, and 10 dioptries. Even these figures may be surpassed.

On direct illumination, with a concave mirror, small crystalline opacities were noticed, especially in the right eye. But the most notable feature of this examination was the ease with which the nucleus of the lens could be outlined, it appearing like a small lens enclosed in the larger mass, and which was displaced in a contrary direction to the movements of the eye without completely disappearing from the field of a moderately dilated pupil.

In the right eye, opacities were already clearly marked in the perinuclear layers; in the left, opacities of the layers nearest the nucleus were made manifest on the crystalline mass by a shadow, which was displaced with the movements of the mirror.

The first impression produced by this examination (especially by skiascopic examination) is that of the central shadow of a keratoconus, or of a lenticonus, if the regularity of the corneal surface has first been established. Indeed, the crystalline opacities are so slight that one is not at first inclined to attribute the diminution in sight to such slight obstructions.

The idea of a conical malformation of the refractive media finds still more weight on examination of the fundus of the eye. When the papilla, which is healthy, is examined with the inverted image through the central portion of the lens, it appears small, and more or less rounded; but on examination through an eccentric portion, the image of the papilla is to some extent deformed, being drawn out and increased in size. The centre of the lens, then, is more refractive than the cortical layers.

Examination with the erect image also shows this deformity of the image of the fundus of the eye, and, in a still more precise way, the particular change in the refraction of the lens. In fact, by the aid of this method, it is shown that the central portion of the eye is myopic in both eyes, while the peripheral portion is hypermetropic.

By the skiascope a central shadow is shown which turns about an axis, as has been described for keratoconus, and also a peripheral shadow which moves in an opposite direction to the movements of a concave mirror. This shadow is only sharp when the pupil is dilated.

Functional examination of the eyes gave the following result:

O.D. M.10., $V = \frac{1}{4}$.

O.G. M.3., $V = \frac{3}{8}$ diff.

A second examination was made on December 24, with this result:

O.D. M.10., $V = \frac{1}{8}$ (1).

O.G. M.6., $V = \frac{2}{3}$ diff.

Vision of the left eye without glasses was barely one-tenth. I also measured with the erect image the peripheral hypermetropia in relation to the papilla, and found it 6 dioptries for the right eye and 4 dioptries for the left eye. The difference, then, between the central and peripheral portions of the eye was 16 dioptries (!) in the right eye and 10 dioptries in the left. 

In the presence of these differences of refraction the idea of lenticonus is easily accepted, hence the necessity of making a careful study of the Purkinge images (2). In my patient the images on the anterior and posterior surfaces of the lens are perfectly normal, and are not changed in form or intensity with the most varied movements of the eyes.

This is not, then, a deformity of the surface of the lens, but a peculiar change in the index of refraction of the lens which greatly resembles the descriptions of lenticonus. I propose to call this condition of cortical cataract by the name of false lenticonus.

Briefly, the central and peripheral portions of the lens have different indices of refraction, and the change of the index is abrupt if the surface of the nucleus and the nearest cortical layers are compared. This change in the index is suggested, on

(1) This myopia, which was shown by the trial glasses, was also found by the patient with Young's optometer. Unfortunately, this apparatus, recently recommended by Tscherning, and which is of great utility from an optical standpoint, is at first very difficult to manipulate, and the patient was unable to measure the refraction of the peripheral portions of the pupil.

(2) There is generally wanting, in the published accounts of lenticonus, a careful study of the Purkinge images. The study of these images is the essential element in the diagnosis of conical formation of the lens. It is well, therefore, to call attention to this condition of the lens, which may simulate lenticonus. Perhaps on more careful examination a large number of supposed cases of lenticonus would disappear.

I must, however, make an exception for the case of lenticonus reported by Gullstrand (*Nordisk Ophthalmologisk Tidsskrift*, VI.). In this case the Purkinge images were studied with much care.

direct examination of the eye, by the demarcation of the nucleus, and by the shadows which are movable.

I was convinced of a pathological demarcation of the nucleus of the lens which was in complete contradiction of the physiological absence of demarcation; but, desiring an optical proof of this phenomenon, I determined to investigate the catoptric images of the nucleus (1).

I took my patient to the ophthalmological laboratory at the Sorbonne, where, with the assistance of Dr. Tscherning, I studied the multiplication of the catoptric images of the lens.

The left eye of the patient was examined in a dark room, by the aid of electric light passing through a circular opening and condensed by a lens, the pupil being dilated with homatropine.

Under these conditions, in certain positions of the eye, five reflex images were seen (2). I have drawn the relative positions of these different images, and my friend, Dr. Seijs, has undertaken to make my drawings more clear.

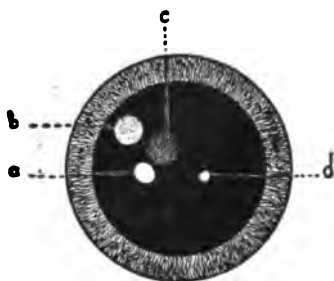


Fig. 1.

- a* Image of the cornea.
- b* — of the anterior surface of the lens.
- c* — of the anterior surface of the nucleus.
- d* — of the posterior surface of the lens and of the posterior surface of the nucleus.

In the first figure the eye was directed in such a way in relation to the light that five images were found in the pupillary field.

(1) Catoptric images of the nucleus have been studied in the eyes of cattle after death by Dr. Tscherning.

(2) In this article I do not take into consideration the image on the posterior surface of the cornea.

The most brilliant image (*a*) is that of the cornea. Behind this is the image from the anterior surface of the lens (*b*), and from the anterior surface of the nucleus (*c*). This latter is more diffuse, less luminous, and situated more in advance than that from the anterior surface of the lens.

At the right of the diagram is seen a small brilliant reflex (*d*), which is the image from the posterior surface of the lens, but which has a small diffused tail. If the eye is turned in such a way that the corneal image falls on the internal portion of the limbus, this small tail is seen to separate from the image from the posterior surface of the lens to form a fifth image situated further back (see Fig. 2). This fifth catoptric image is quite dif-

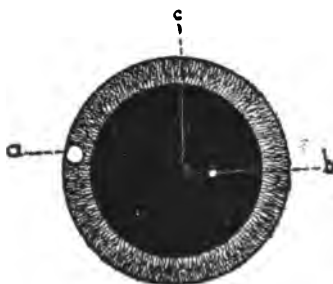


Fig. 2.

- a* Image of the cornea.
- b* — of the posterior surface of the lens.
- c* — of the posterior surface of the nucleus.

fused, and has its origin in the posterior surface of the nucleus (1).

Two conclusions may be deduced from the study of these four catoptric images of the lens:

1. The images on the nucleus are the nearest to the axis of the eye, and are at different levels. The image from the anterior surface of the nucleus appears further forward than that from the anterior surface of the lens. In the same way, the

(1) I have also been able to observe this multiplication of the Purkinje images, with the same positions and appearances, in two other aged patients, also affected with false lenticulus.

image from the posterior surface of the nucleus appears further back than that from the posterior surface of the lens.

This arrangement of the images shows that the radii of curvature of the nucleus are smaller than the radii of curvature of the lens.

2. The catoptric images of the nucleus are diffuse. If, then, it is true that there is a separation or a sensible difference between the nucleus and the cortical layers, it is also true that this separation is not altogether abrupt. There is a certain point of transition in the index of refraction.

These curious changes of refraction which the eye undergoes are, I think, easily explained from an optical standpoint. But before giving my views, so different from those published up to the present time, I wish to review briefly the development of cortical cataract, as it is treated by the most prominent authors.

The actual cause of senile cataract is a sclerosis of the nucleus of the lens, which is only one of the general manifestations of the tendency which tissues of epidermoid origin have to become hardened (1).

Retraction of the nucleus is, then, a constant senile manifestation. If this retraction takes place in a slow and progressive manner, so that the cortical layers have time to become identified, little by little, with the structure of the nucleus, we have, as a result, a hard, black cataract—the cataract without a nucleus, as Wenzel calls it.

If, on the other hand, the retraction of the nucleus takes place irregularly or rapidly, then the cortical layers are separated from the nucleus by an interstice which is filled with a serous fluid. This, then, is the origin of the semi-soft senile cataract, cortical or nucleolar.

The chemical changes which occur during the development of a cataract are also very interesting in the explanation of false lenticonus. While the black cataract is characterized by a pro-

(1) WECKER and LANDOLT: *Complete Treatise*, Vol. II.

gressive sclerosis of the lens, without loss of solid substance, there is always in a cortical cataract a more or less perceptible loss of albuminoid substances, which escape into the aqueous humor (Ed. Jaeger).

In the first period of this last variety of cataract, which alone interests us in this article, there exists, along with this loss of albumen, an increase of water in the cortical layers, which produces a slight swelling of the lens.

I have thus briefly stated the development of senile cortical cataract in order to deduce two conclusions :

1. The nucleus of cortical cataract undergoes no other changes than those of senile sclerosis. It is almost identical with the nucleus of a very aged person. All ophthalmologists who have studied a complete cortical cataract have been struck with this fact.

2. The refraction of the cortical layers of the lens is, I think, diminished in the first period of nucleolar cataract. This diminution in refraction is a necessary consequence of the loss of solid substances in the lens, which are replaced by water.

I wish now to relate several facts in physiological optics which were known to Thomas Young (1).

The lens is composed of a series of superimposed layers whose indices of refraction increase progressively from the periphery to the centre, and which have the form of diverging menisci. The nucleus of the lens is almost spherical, and, therefore, while its index of refraction is greater than that of the cortical layers, its radii of curvature are smaller than those of the anterior and posterior surfaces of the lens.

The lens, for simplicity, may be considered as composed of three lenses : The first, the nucleus, represents a strong convergent lens, while the other two, the anterior and posterior cortical layers, act as two diverging lenses.

(1) *Ophthalmological Works*, annotated by Dr. Tscherning, p. 133.

There are then two different and contrary forces acting in the lens: The converging force of the nucleus, and the diverging force of the periphery. If the index of refraction of the cortical layers is increased, the diverging force is increased—that is, the focus of the entire lens is lengthened. The refractive power of the lens would thus be less if the index of refraction of the cortical layers was equal to that of the nucleus (1).

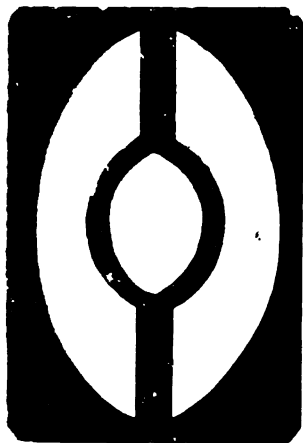


Fig. 3.

The lens resolved into three lenses (after Landolt).

I am now in a position to explain the changes in a commencing cataract and the appearance of false lenticonus.

Central myopia of a more or less high degree may depend either on an increase in the refractive power of the nucleus or a decrease in the refraction of the cortical layers, or on these two factors combined.

If the cortical layers are not changed, a very slight increase in the index of refraction of the nucleus will cause a myopia of 10 dioptries, or even more, in the central portion of an emmetropic eye.

If, on the other hand, the refraction of the nucleus is not changed, the same changes of refraction may be explained by a slight diminution in the refraction of the cortical layers, thus reducing the divergent force which exists in the periphery of the lens, and which in an indirect manner increases the refraction in an opposite way from the nucleus (2).

(1) LANDOLT, in Wecker and Landolt, Vol. III.

(2) Under the direction of Dr. Tscherning, I have been able to calculate how slight a change in the index of the cortical layers would produce a perceptible change in the refraction. If these figures are not perfectly exact, they are sufficiently so for a comparative calculation.

Suppose the radii of the surfaces of the lens (RR') are 10 and 6 mm.; those of the nucleus (rr') 4 and 2.50 mm. Suppose that the index of refraction of the nucleus is 1.06 (1.41 in relation to air), that of the cortical layers 1.045 (1.39).

Which of these two theories is the true one?

In favor of the latter are the following reasons:

1. Anatomical study, which was briefly summarized above, shows that the lens undergoes actual changes only in its cortical layers. In these layers, there is a subtraction of an appreciable quantity of albumen (Deutschmann), and at the same time an addition of water. While the index of refraction of the periphery of the lens diminishes at the onset of cortical cataract, the nucleus is undergoing senile sclerosis almost insensible,

The refraction of the nucleus will then be :

$$\frac{1}{f} = n - 1 \left(\frac{1}{r} + \frac{1}{r'} \right) = 0.06 \left(\frac{1}{4} + \frac{1}{2.50} \right) = 39 \text{ dioptries.}$$

That of the cortical layers will be :

$$\begin{aligned} \frac{1}{f'} + \frac{1}{f''} &= n' - 1 \left(\frac{1}{R} - \frac{1}{r} - \frac{1}{r'} + \frac{1}{R'} \right) \\ \frac{1}{f'} + \frac{1}{f''} &= 0.045 \left(\frac{1}{10} - \frac{1}{4} - \frac{2}{2.50} + \frac{1}{6} \right) = -17 \text{ dioptries.} \end{aligned}$$

The refraction of the entire lens will then be $39 - 17 = 22$ dioptries, from which the total index may be calculated:

$$\begin{aligned} \frac{1}{f} &= n - 1 \left(\frac{1}{R} + \frac{1}{R'} \right) = 22 \text{ dioptries.} \\ \frac{1}{f} &= 22 \text{ dioptries} = n - 1 \left(\frac{1}{10} + \frac{1}{6} \right) \end{aligned}$$

$$n = 1.44 \text{ (in relation to air).}$$

Suppose now, that the index of the nucleus remains the same, while the index of the cortical layers diminishes to 1.02 (1.36 in relation to air).

The refractive power of the cortical masses will then be :

$$\begin{aligned} \frac{1}{f'} + \frac{1}{f''} &= n' - 1 \left(\frac{1}{R} - \frac{1}{r} - \frac{1}{r'} + \frac{1}{R'} \right) \\ \frac{1}{f'} + \frac{1}{f''} &= 0.02 \left(\frac{1}{10} - \frac{1}{4} - \frac{1}{2.50} + \frac{1}{6} \right) = -7.50 \text{ dioptries,} \end{aligned}$$

therefore the cortical layers lose 9.50 dioptries, which is gained by the nucleus in myopia.

The refraction of the peripheral portion was

$$0.045 \left(\frac{1}{R} + \frac{1}{R'} \right) = 12 \text{ dioptries.}$$

It is now

$$0.02 \left(\frac{1}{R} + \frac{1}{R'} \right) = 5.50 \text{ dioptries.}$$

Toward the periphery there will be a hypermetropia of 6.50 dioptries.

at least in its structure, to the more rapid changes of the portions surrounding it.

2. If the change of the index of refraction of the nucleus can account for the central myopia, it can never explain the existence of a high degree of peripheral hypermetropia, which is found in these cases.

Intelligent patients, such as the one whose case is above reported, can give quite accurate statements as to the former condition of their refraction. My patient, a man very careful of his eyes, claims that he always had perfect vision both for near and far points. He had passed forty-five years without needing glasses to read, or to write in his account book. Without material error, it may be said that he was formerly emmetropic, or nearly so. In any case, it could not be said that his eyes were formerly hypermetropic to the extent of 6 and 4 dioptries. With this degree of emmetropia, one does not reach the age of forty-five years with good vision for far and near points, and it would be impossible to write without glasses.

If the changes in the nucleus were sufficient to explain the existence of a high degree of central myopia, the diminution in peripheral refraction could never be explained by this single factor. On the other hand, the same alteration in the cortical layers explains all the phenomena: the paracentral hypermetropia by direct action, and the central myopia by diminution of refraction opposite to that of the nucleus.

3. Another phenomenon which I have observed in many patients is the rapid progress of the myopia. I have said, in the case reported above, that in the space of nineteen days the myopia, which in the left eye was 3 dioptries with acuity $\frac{2}{3}$ (diff.), increased to 6 dioptries with the same acuity. In another patient, seventy-four years of age, I found in the left eye, on November 15, 1894, a myopia of 3.50 dioptries, from false lenticonus. On December 23, the myopia was 11 dioptries, with reduction of the visual acuity.

At the clinic in the Rue du Cherche-Midi, when I wish to compare the visual acuity of an eye with opacities of the lens at two different periods, I am in the habit of diminishing the

convex glass in the second examination, if the patient was formerly hypermetropic, or of increasing the concave glass, if myopia had already been shown. In this way I obtain, in the majority of cases, a better visual acuity than with the old correction.

I wish also to call attention to a fact that I have frequently noticed, and which existed in the case reported: The myopia may increase to an appreciable extent without a notable change in the visual acuity after correction. With myopia of 3 and 6, the visual acuity always remained $\frac{3}{8}$ in my patient.

This rapid change in the myopia does not greatly favor the idea of a change in the nucleus of the lens. The sclerosis of the nucleus is a process of very slow progress; it remains almost unnoticeable for many years, and although starting in youth, it does not become apparent until an advanced age is reached. To admit of rapid alterations in the intimate structure of the nucleus of the lens, especially at a very advanced age, is to contradict the physiological laws which govern its development.

Let us see, on the other hand, what is taking place at the same time in the cortical layers. The microscope, the ophthalmoscope, and experimental studies, all show an appreciable and evident change in these layers. During this time, the nucleus remains uninfluenced by the more or less rapid changes of the surrounding portions, and it may retain its physiological aspects in the centre of a ripe cataract.

If a change in the nucleus is claimed, it can only be a decrease in its radii of curvature, a thing which is improbable, and which by itself is insufficient to explain the clinical picture of false lenticonus.

I stated at the beginning of this article that another kind of myopia might be seen in the course of a cortical cataract without showing in a precise way a diminution in the refraction of the peripheral layers. If these patients are carefully examined, it will be seen that the opacities are quite near the anterior surface of the lens. In this case, the nucleus is not outlined, and the layers nearest to it are transparent.

It must be admitted here that the diminution in the refraction of the cortical layers occurs in the more eccentric layers, and it is these alone which are altered. The divergent force of the periphery is then diminished to a certain degree, and the increase of the refractive power of the nucleus is dependent upon this degree of diminution. Naturally, in these cases, the myopia is much less, and I have never seen it surpass 3 or 4 dioptries. The hypermetropia, which is entirely peripheral, is almost impossible to observe.

Whenever I find a myopia of 6, 8, or 10 dioptries in the course of a cortical cataract I am sure of finding a peripheral hypermetropia if the pupil is dilated.

In recent articles on this subject, this myopia is generally attributed to an increase in volume of the lens. I think this explanation altogether improbable. The refractive power of a lens never depends on its volume, but on the length of the radii of curvature of its two surfaces. If the lens is swollen in a uniform manner without changes of the index, it will have the same value as a lens that it formerly had. In order that this swelling of the lens may increase the convergence of the visual rays which traverse it, an increase in the curvature of its surfaces is necessary—that is, a diminution in its radii of curvature. The diameter of the lens should not increase.

But clinical observation shows that in these varieties of senile cortical cataract it is the portions nearest the border of the lens which give origin to the striæ which later on invade the entire lens. The border of the lens would then swell and increase in size, thus preventing a total increase in the refraction.

Physiological study also shows that the lens derives its principal elements of nutrition in the neighborhood of its equator. It is also in the perilenticular space that the great nutritive current of the eye passes. Slackening or changes of this current which would cause alterations in the character of the lens would consequently react with greater energy on its equator.

I think that I have shown in my article that cortical cataract at its onset may present many surprises by resembling in the most evident manner a lenticonus. The most careful examina-

tion of the capsular reflexes is indispensable, in these cases, to make a diagnosis. Unfortunately, not enough importance is assigned to-day to catoptric images in the eye.

MODERN CATARACT EXTRACTION

By Mr. Charles **BELL TAYLOR** (Nottingham).

When Dr. Waldau, von Græfe's assistant, proposed to excise a small portion of the iris and to extract cataract with a spoon, he did so because, while suppuration of the eyeball was not rare after cataract extraction, it never occurred after a simple iridectomy. The idea occurred to me that a slight enlargement of Waldau's incision would enable us to dispense with the spoon, and it was doubtless by a similar reasoning that von Græfe was led to adopt his celebrated method of linear extraction. Von Græfe dispensed with the spoon, and made his incision much further back than Waldau, so that, as he says, it should coincide with a meridian of the eyeball, and as it was quite impossible to make such a section either with the large keratome used in Waldau's operation (Fig. 1), or with the cataract knife in vogue at that time (Fig. 2), it became necessary to invent the long narrow blade known by the name of Græfe's knife (Fig. 3), and which, since its invention, has played such an important part in the technique of ophthalmic surgery.

The advantages of von Græfe's operation are as follows : The sclera, which alone is incised, is far less inclined to suppurate than the cornea ; the elasticity of the tissues in this region, and the linear character of the incision, render separation of its edges almost impossible ; while the conjunctival flap, which after-



Fig. 1.

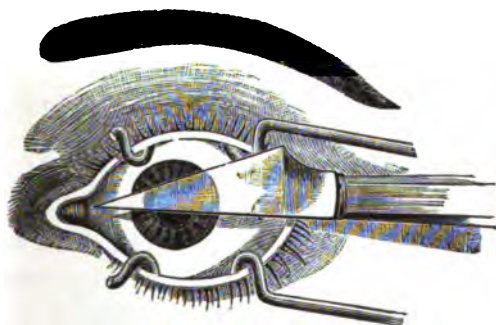


Fig. 2.



Fig. 3.

wards becomes adherent to the sclera, is a powerful safeguard against microbial infection (1).

On the other hand, an extensive iridectomy is necessary with this form of incision; the proximity of the edges of the wound, while assuring rapid cicatrization, render the extraction of the lens somewhat difficult. Hemorrhage frequently complicates extraction, the vitreous is likely to escape, and iritis, irido-cyclitis, and sympathetic ophthalmia are more frequent in this than in any other method of cataract extraction.

Evidently the disadvantages exceed the advantages; those who have adopted, or were supposed to adopt, von Græfe's operation, have considerably modified it, so that it might be said that nothing remains of the operation but the knife. The modifications all tend in the same direction: advancement of the incision, either to the sclero-corneal junction or to the corneal tissue proper. This operation, the modified von Græfe, as it is called, which I adopted more than twenty years ago as an improvement on the spoon extraction of Waldau, is to-day the favorite operation of the majority of ophthalmologists (2).

Unfortunately, if I may venture to say it, it necessitates the mutilation of the iris, and since it is possible, and even easy, to extract the lens without cutting the iris at all, it is not surprising that certain modern surgeons, without being restrained by the authority of von Græfe's name, have ventured to enlarge still more Waldau's incision, and have finally dispensed, not only with the spoon, but also with the iridectomy.

It is important to consider on what grounds the modified von Græfe operation, or the combined method—that is, iridectomy combined with extraction—should be considered as the operation *par excellence*. It may be affirmed and maintained that this method of operation does not lead to contusion of the iris, and prevents prolapse; that it enlarges the pupillary area

(1) Manolescu, Knapp, and others. Transactions of the Heidelberg Congress, 1886, p. 164.

(2) See my essay, "A New Method of Cataract Extraction," published in the *Edinburgh Medical and Surgical Journal* for February, July, and April, 1868.

and increases the chances of future vision; that it greatly facilitates the escape of the lens and forms an opening for the harmless escape of the aqueous humor, and reduces to a minimum the necessity for secondary operations, which are questionable.

On the other hand, it is plain: that the extent of wounded surface is doubled by excision of the iris; that the entire method is contrary to the sacred principles of conservatism which should animate every surgeon; that cocaine, though a powerful anæsthetic in simple extraction, is insufficient to prevent pain, spasm, and resistance provoked by excision of the iris; that iridectomy prolongs the operation, fills the anterior chamber with blood, and exposes the capsule of the lens, the vitreous, and the uveal space to all the dangers of entanglement, protrusion, and infection; that it is an error to suppose that the lens and capsule cannot be easily extracted without hurting the iris, and that the visual and cosmetic results are far superior when the pupil is left intact and free in the anterior chamber.

These are certainly strong and powerful objections to iridectomy; however, it is impossible to deny that the majority of ophthalmologists still practise it. Why is this? Simply because, although iridectomy does not at times prevent entanglement and prolapse of the iris in the angles of the wound, it undoubtedly prevents prolapse of a large fold of this membrane between the lips of the incision. If we could prevent this escape of the iris, the dreaded prolapse, the *bête noir* of extraction, we would never think of excising the iris; but the method of preventing it without cutting the Gordian knot, and without altering the form of the pupil, is the problem which to-day awaits solution.

Let us see what has been accomplished in this direction. Prolapse may be prevented by excision of the periphery only of the iris (Fig. 4); by reduction of the tension, if it is in excess, or seems liable to be so; by taking great care that the edges of the wound are properly placed for coaptation; by careful evacuation of the anterior chamber, so that no protrusion may result from swelling of the cortical masses; by scrupulous attention

to the dressing, to prevent reflex spasms. One should also be assured of the intelligent co-operation of the patient to avoid accident during or after the operation.

When the eyeball has been incised, the wound closes, and the



Fig. 4.

anterior and posterior chamber are ordinarily restored after three or four hours; the union between the lips of the wound is very slight, and if during the first days the patient coughs violently, is restless, sneezes, or contracts the lids, the aqueous humor will surely be driven out, and the iris protrude between the lips of the incision. Common sense will dictate what precautions should be adopted, what regimen to follow, what advice to give to avoid accident, and although I must admit that the surgeon is anxious during the first days after a simple extraction, I do not think, all things being considered, that in adopting this operation there is much to fear; prolapse is the only danger, and certainly in the great majority of cases it does not occur. A slight prolapse is not of great importance, and an extensive one, when it occurs, may ordinarily be corrected by future treatment and ultimate formation of an artificial pupil.

Fuchs insists upon iridectomy as a necessary part of extraction "when there is a tendency to conjunctivitis, or when the eyeball is prominent, or when there is a tendency to prolapse of the iris, when the pupil is rigid, or the cataract is not ripe, and

when the patient is in bad health, or has only one eye." One should be guided by his own judgment, under such circumstances, but I have frequently performed simple extraction in cases where these contra-indications existed with the best possible results.

In regard to the technique of the operation, everything depends upon the first incision; its form, its size, and its position are therefore of the greatest importance. I prefer to make a small flap above, 3 to 5 millimetres, because in this situation the wound is better protected than when it is made below, and less likely to be infected than when it is exposed in the gap formed by the two lids.

Galezowski diminishes the height of the flap by making his puncture and contra-puncture in the sclera, and completes his incision at the summit of the cornea, as he says, to avoid prolapse of the iris, while Perrin, Warlomont, Monoyer, Teale, and others encroach more or less upon the cornea.

I think, however, that the best position for the wound is in the sclero-corneal junction, because in this situation the iris is less inclined to prolapse, the wound cicatrizes more rapidly, is less likely to suppurate, leaves a less apparent scar, and produces no astigmatism (1).

Wherever the incision is placed, one should be sure that the section is large enough; an incision a little larger than necessary is of no consequence, but if it is too small it may lead to serious results.

The knife that I use is much finer and narrower than that of von Græfe; it is curved at such an angle that the right hand may be used, if necessary, for the left eye (Fig. 5).

I always hold the eyeball with fixation forceps, and having inserted the knife at the sclero-corneal junction, just above the horizontal meridian at the base of the proposed flap, I pass it

(1) At the time when I operated upon all forms of cataract without iridectomy I thought at first that prolapse of the iris could be avoided by making a corneal section like that of Liebreich. This was an error which I promptly corrected, and since that time I have made the wound entirely in the vicinity of the corneal border. Prolapse and entanglement of the iris are thus rendered less frequent.

rapidly through the anterior chamber until the point escapes at a contra-puncture symmetrically placed. Then I cut rapidly upward, in order to pass in front of the iris, which would otherwise attach itself to the blade of the knife, and slowly complete the section quite near the vascular limbus of the cornea. Several surgeons, Schweigger, Gayet, Tweedy, Swanzy, Valude, Trousseau, and others prefer to incise the capsule during the passage of the knife through the anterior chamber, but I prefer

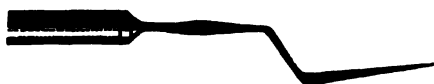


Fig. 5.

to use a cystitome delicately introduced beneath the upper border of the pupil, and confine the incision to the periphery of the capsule or the equator of the lens. Projection of the lens indicates the result of the incision, and then a slight pressure will induce the lens to turn on its axis and present in the pupil, which it slowly dilates, before it escapes, followed by cortical masses.

If the cataract does not move, it is because the capsulotomy is insufficient, the lens larger than was supposed, the iris too rigid, the corneal incision too small, or because the lens itself is so contracted that it does not respond to as strong a pressure as can be made without danger; in this case the capsule should be reincised, the corneal wound enlarged with scissors, an iridec-tomy made, or the cataract extracted with a spoon.

When the periphery alone has been incised, as Knapp advises, the cortical débris, if there is any, is relatively of no consequence, but in any case it may be easily cleared out by irrigating the conjunctival sac with a warm sterilized solution of common salt ($\frac{1}{2}\%$). Small fragments may be visibly brought into the field of the pupil and easily expelled without introdu-

cing any instrument between the lips of the incision. The iris, which then frequently prolapses, may be easily returned to place by a slight massage on the closed lid, while contraction of the pupil is assured by instilling a drop of a solution of eserine. It is of the greatest importance to keep the wound from contact with the external air, so that ordinarily I do not remove the tampon placed on the closed lid during the first two or three days; the eye is not opened until the sixth day; it is also well to put cocaine and eserine in the eye not operated upon, and to limit the movements of the eye which has been operated upon by keeping the other closed.

In the way of antiseptics, I use a 4% solution of boracic acid; the supporting instruments are sterilized by exposure to the heat of a lamp, which I always use in my operations, while the cutting instruments are rendered aseptic by immersion in absolute alcohol.

To understand that the objections to this simple operation are neither valid nor serious, the following comparative statistics of the two operations, furnished by Dr. Greefe, of Professor Schweigger's clinic, and which may be considered as average figures, should be consulted:

Without Iridectomy	With Iridectomy
(450 operations)	(371 operations)
Successes.....346 or 76.5 per cent.	Successes.....278 or 75.1 per cent.
Secondary cataract. 84 or 19.1 "	Secondary cataract. 71 or 19.2 "
Eyes lost..... 20 or 4.4 "	Eyes lost..... 22 or 5.7 "

It is stated that the only advantage of iridectomy is that it prevents an extensive prolapse of the iris, which is proved. It is also said that the only advantage of simple extraction is that it preserves the natural appearance of the eye, which is without doubt true, but far from being the entire truth. The picture which is given of old and tottering men and women who have lost all interest in life, who care nothing for personal appearance, who, provided they see, do not insist upon seeing well, and whose eyes are so well hidden by the thick glasses which

they are obliged to wear that it is impossible to say whether they have had an iridectomy or not, is really only applicable to a very small number of persons operated upon for cataract.

RECURRENCE OF A HYDATID CYST OF THE ORBIT TWO YEARS AFTER A FORMER OPERATION

By Dr. **TERSON** (Toulouse).

Hydatid cysts of the orbits are so rare among us that it may be interesting to give the complete history of each case. With this in view, I now recall the account of a case published in *Annales d'Oculistique* (March, 1893) under the title of "Cyst of the Orbit, Probably of Hydatid Nature, with Exophthalmus, Cured by a Simple Puncture."

A boy thirteen years of age presented, as a sequel to an acute enteritis, a large tumor in the supero-internal region of the left orbit, with marked deviation of the eye outward and downward. Interference with the retinal and retrobulbar circulation was shown by a considerable papillary stasis with diminution of the visual acuity below $\frac{1}{10}$. The pressure on the eye from behind forward had modified the refraction, producing a hypermetropia of 1.75 D. The tumor was of quite regular form, but there was neither fluctuation, pulsation nor murmur, facts which led me to make an exploratory puncture, with aspiration. In this way 15 to 20 grammes of an absolutely transparent and colorless liquid was evacuated. At the same time, the eye resumed its natural position in the orbit. On the next day visual acuity had increased from $\frac{1}{10}$ to $\frac{1}{2}$. On the sixth day the temporary hypermetropia had almost disappeared, and the acuity had returned to the normal.

After three months, this satisfactory result was not altered, and I presented the patient at the Medical Society of Toulouse (January 21, 1893) as an example of a probably permanent cure.

One of my colleagues doubted the diagnosis of hydatid cyst, and even of a cyst, and stated that he regarded the case as a serous tenonitis.

At the end of a year a sort of nucleus of induration was observed at the point formerly occupied by the cyst, without exophthalmus or diminution of visual acuity, and which was attributed to the retraction of the thickened walls of the sac of the cyst.

During the present summer, two years after the former treatment, the exophthalmus reappeared quite suddenly, leaving no doubt of a recurrence of the former trouble, and after several weeks of delay the patient again came under my care. As before, the pressure from the tumor had produced a very marked papillary stasis, with reduction of vision to vague perception of light. The volume of the tumor was considerably less than before; absence of fluctuation would indeed have suggested a solid tumor, if the result of the former treatment had not been an element of certainty in the diagnosis.

There was undoubtedly a recurrence of the cyst formerly punctured; but was the diagnosis of hydatid cyst (originally given from the resemblance of the encapsulated liquid to rock-water) exact, in the absence of microscopic examination for scales of scolex, or other hydatid débris? With the aim of determining the diagnosis and of reaching a more radical cure, I undertook, considering the relatively moderate size of the tumor, to effect its complete extirpation. The rounded mass of the cyst was carefully separated from the surrounding tissue, but the very deep implantation of the tumor was an insurmountable obstacle to the entire realization of my project, hemorrhage at length preventing further manœuvres. Through fear of causing too great injury, I cut through the wall of the cyst with scissors, in order to diminish the size of the tumor and to render the deep parts more accessible. Immediately there appeared several intact hydatid vesicles of various sizes, thus confirming my first diagnosis. This discovery induced me to perform a careful scraping of the sac with a sharp curette, in order to destroy all its contents, and especially such parasites as might be hidden in the deeper parts. In this way there was removed a large quantity of membranous débris of numerous daughter vesicles, which broke under the instrument and led to the escape of more colorless fluid. Prolonged irrigation with a solution of sublimate of 1 to 2,000 brought out still more débris. By then drawing the sac forward with strong forceps, I excised it as deeply as possible. Four sutures closed the wound, and a compressive dressing was applied.

Several hours later, the dressing was saturated with a somewhat abundant hemorrhage. During the first few days, there was fever, swelling of the lids, and a certain amount of protrusion of the eye, which caused me to fear an orbital phlegmon. But on the fifth day, after decided ecchymosis of the conjunctiva, the exophthalmus and chemosis rapidly diminished, and everything resumed its proper condition.

On the fifteenth day, visual acuity had increased to $\frac{1}{2}$; on the 25th day, after the correction of a very slight hypermetropia, the acuity was almost equal to 1. Recovery was then assured and imminent. Is it to be permanent?

This sequel to my interesting case shows that the diagnosis of hydatid cyst may in certain cases be made with precision entirely from the physical qualities of the cystic fluid; it also shows the error of my colleague, who, contrary to my own opinion, believed in the existence of a serous tenonitis, not taking into consideration the fact that this latter affection produces a *direct* protrusion of the eye, as I clearly showed in my case that the exophthalmus and the deviation of the eye *was outward and downward*.

The recurrence further shows the insufficiency of simple puncture of hydatid cyst, notwithstanding the considerable time during which cure may seem to be assured. It must, then, be candidly admitted that it is proper to add to the puncture injection of a parasitocidal solution, as has been recommended in general surgery for hydatid cysts of the liver, or to employ some other method of treatment.

Was the attempt at total extirpation of a sac justifiable in this case? Yes, if one considers: 1, the moderate size of the tumor; 2, the absence of fluctuation, which indicated very thick walls and removed the fear of penetrating the sac by a puncture; 3, the danger, perhaps imminent, of extension to the cranial cavity, instances of which have been reported, the intra-ocular lesions clearly showing that the optic nerve was already implicated at least in its envelope. However, the difficulties encountered in the course of the operation show that one should not in this case, as in many other things, look for an absolute

method ; it was for this reason that during the operation my plan was changed and different methods were combined, either of which alone would not have produced a more permanent result than simple puncture: incision of the sac, curetting, and of prolonged antiseptic irrigation.

The extirpation of the mother vesicle of an echinococcus cyst has been performed by simple traction with forceps after incision of the connectival tissue envelope surrounding it. I think that this result might be realized in cases with very small cyst (Valude). Long irrigation may facilitate success. But careful curetting of the sac seems to give a sufficient guarantee by rendering the destruction of the parasites with a solution of sublimate more easy.

I would not advise the use of a drain after incision of the cyst, because, while it may lead to the expulsion of the mother vesicle, it frequently provokes suppuration in the sac, which may spread to all the fatty tissues of the orbit and lead to loss of vision. The use of rigorous antisepsis does not entirely prevent accident in such a region as the conjunctival sac, where, even in the normal state, various microbes are found, which become dangerous as soon as an opening is made to infection.

In conclusion, I would recommend the following treatment of hydatid cysts of the orbit :

1. Puncture with aspiration, followed by parasitocidal injection (sublimate 1 to 1,000).

2. In case of immediate non-success, incision of the sac and an attempt completely to remove the mother vesicle by traction with forceps, followed by prolonged irrigation with a solution of sublimate 1 to 2,000, better borne by the conjunctiva than the 1,000 solution.

3. In case of recurrence : If the cyst is not large, complete extirpation may be attempted, which will be possible without much injury when the tumor does not extend too deeply. But in different conditions, the important phase of which will be a marked papillary stasis, a partial extirpation should be attempted as deep as possible after having destroyed by curetting and anti-

septic irrigation the primary vesicle and the hydatid secondary cysts which it contains.

I would reserve, then, extirpation of the cyst for cases of recurrence, because this is a laborious operation, on account of the very limited space in which the instruments must be manipulated, and as the various tissues contributing to the motility of the eye may be injured.

It is well to know in advance what one may do and what is to be avoided, as few details in this connection have been written. It is also very difficult to possess an extensive personal experience of these cases, as in a thirty years' practice this is the only case of hydatid cyst of the orbit which I have observed.

Let me, in closing, emphasize several points worthy of remembrance. My young patient had no periorbital neuralgic pains, such as are seen in echinococcus cysts of the orbit ; also there did not appear, before treatment, any of the signs of infection of the neighboring tissues often seen in cases of cysticercus of the same region.

The youth of this patient (thirteen years) and his sex are to be noticed in comparing with hydatid cysts of the liver. According to statistics, men are attacked 80% more frequently than women.

I would refer to the former portion of my article for information regarding the literature of hydatid cyst of the orbit.

II.—REPORTS OF SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of February 5, 1895.

Traumatic Cataract.

DR. MEYER presented a patient with a traumatic cataract caused by the penetration of a foreign body into the lens. The opacity of the lens assumed a star-shaped form, but later, after having been quite pronounced, it gradually decreased to such a point that vision at present equals $\frac{1}{3}$. The foreign body is easily seen in the lower portion of the lens in a region which does not correspond to the point of entrance, and which it has reached by virtue of the law of gravitation. There has been no reaction, and Dr. Meyer thinks that under the circumstances expectant treatment was advisable.

Dr. Chevallereau thought that immediate operation was preferable, and that it was better, in consideration of the results of operation, not to wait until forced to operate by inflammatory symptoms.

Drs. Valude and *Darier*, on the other hand, favored expectant treatment, by reason of the absence of reaction and the preservation of the visual acuity.

Gummatous Syphiliderm of the Conjunctiva.

DR. MEYER then presented, in the name of M. de Rothschild, a student, a model of the eye of a syphilitic patient, which presented papules situated at the point of the sclero-corneal limbus of the right eye, associated with an intense cutaneous irruption. The papule formed a projection of $1\frac{1}{2}$ millimetres, was the size of a bean, and overlaid the cornea and the conjunctiva; in the conjunctival portion was a well-marked zone of vascularization. These lesions disappeared only under very prolonged treatment.

The Advantage of Convex Glasses for Distant Vision in Myopia.

DR. MASSELON.—(*See the article in full in this number, p. 83.*)

A Case of Traumatic Amblyopia.

DR. TROUSSEAU.—A young girl fourteen years old received a blow on the left eye in December, 1893. Her piano teacher, by a rapid movement, struck her in the eye with the corner of a sheet of music. On the next day, the eye was somewhat red, and there was lachrymation. The patient felt the presence of a foreign body, and claimed that a piece of paper had surely entered the eye. A careful search by the attendant physician revealed nothing. The acute condition lasted fifteen days, then subsided, and the eye regained its normal aspect. From that time, the young girl complained of a progressive diminution of vision, until in March, 1894, she declared she could see nothing with the left eye. Two distinguished ophthalmologists saw the patient and gave a diagnosis of hystero-traumatic amblyopia. In July, 1894, I saw the patient, and found complete amaurosis of the left eye, with dilatation of the pupil and anæsthesia of the upper lid. Mydriasis did not prevent the pupil reacting to light.

Every precaution was taken to detect simulation.

Thanks to careful watching, I was sure that the young patient did not use any mydriatic. When, at a later examination, I turned back the upper lid and exposed the superior cul-de-sac, I was surprised to find a small lacerated bit of paper, which was covered over with mucus. I asked myself if the patient had not herself placed this paper between the lids, but although this was possible, I decided that the evidence was against it, as the condition of the foreign body was such as to suggest a long sojourn in the cul-de-sac. On the next morning, a small bit of paper was found in the internal angle of the eye, and from that time the symptoms improved, so that fifteen days after, vision was perfect. The mydriasis and palpebral anæsthesia had disappeared.

Was this a curious form of reflex traumatic amblyopia, an hystero-traumatic amblyopia, or a pretended amaurosis? The clinical facts seemed interesting enough to be reported.

A New Method of Cleaning out Cortical Fragments after Cataract Operation.

DR. CHIBRET.—This method consists in the simultaneous use of injection and aspiration. An ingenious device made by Aubry accomplishes this result with a syringe modelled after that of Anel. Chibret has combined aspiration and injection in a systematic manner in thirty cataract operations. He is well satisfied with the result, as it does away with secondary operations and leaves the pupils clear.

He has found only one inconvenience, a disturbance of the anterior chamber lasting about eight days in cases where a large quantity of liquid (20 grammes or more) has been used. This disturbance disappears and leaves very clear pupils in cases where otherwise a secondary operation would have been advisable or necessary.

Chibret thinks that, with the exception of sclerosed cataracts of people over sixty-five or seventy years of age, one is never sure, even with a clear pupil, of not leaving cortical fragments at the equator, which may compromise the visual acuity. He has been able, with his instrument, to extract from the posterior chamber a large amount of cortical fragments in cases where the condition of the pupil, friction of the lids, and injections indicated a perfect cleansing.

Delirium after Cataract Operation.

DR. J. SANTOS FERNANDEZ (Havana) describes seven cases of delirium following cataract operation. In his opinion delirium is not caused by a single and identical factor. Occlusion of the lids, nostalgia, age, moral impression, diet, alcoholism, the use of alcohol by patients not accustomed to it, and the absorption of atropine, may all be exciting causes of the delirium. Warlomont observed it in old people from simple occlusion of the lids. Sichel has never seen it in people under sixty years of age. Parinaud thinks that the cerebral disorders should be attributed to the prolonged occlusion and lack of nourishment. Grandclément and Galezowski think that the influence of atropine cannot be doubted.

Chibret mentions alcoholism as a cause. Gillet and Grandmont refer to diet. After operation, Schmidt-Rimpler thinks that it is caused by the abrupt suppression of the irritation which light exercises on the optic nerves. Martin attributes it to diet.

Pseudo-Membranous Conjunctivitis.

DR. ELIASBERG (Salonique) described two cases of pseudo-membranous conjunctivitis and three cases of ophthalmia in the new-born, complicated with the formation of false membrane. No bacteriological examination was made. Treatment consisted of daily applications of ointment of yellow oxide of mercury in the strength of 1 to 40, followed by a moist antiseptic dressing of boric acid, renewed every twenty-four hours. All these cases terminated favorably, with one exception, in which about the fourth week symmetrical ulcerations

were formed in both corneæ, which left no other trace than slight simple leucomas.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of January 31, 1895.

Two Cases of Diphtheritic Conjunctivitis Treated by Klein's Antitoxine.

MR. JESSOP described two cases of pseudo-membranous conjunctivitis in young children of undoubted diphtheritic character, as was shown by the presence, at the site of the lesion, of the bacillus of Loeffler, the virulence of which was proved by inoculations in a guinea pig. One of the little patients was eighteen months old, and had a diphtheritic throat; in the other, nineteen months old, there was a nasal diphtheria. In both cases the ocular lesions were bilateral, and invaded only the palpebral conjunctiva. In the case of the first child, the speaker made three injections of Klein's antitoxine in the dose of 4 grammes to an injection, and in the second case two injections of the serum in the same dose. The false membranes disappeared in the first patient in three days, and in the second in four days. In the first case, there was an apparent relapse in the form of a false membrane situated on the left tonsil, but the presence of Loeffler's bacilli could not be shown. No local treatment was employed in Mr. Jessop's patients; he contented himself with cleansing the eye with distilled water.

Mr. Hayward.—I examined the false membranes in the two cases, and found Loeffler's bacilli in great abundance.

The membrane was very well marked in both cases, but was only on the palpebral mucous membrane. Its complete and rapid disappearance could only be attributed to antitoxine, as I have never seen a case recover so rapidly.

Mr. Mackinlay.—I have also obtained rapid recoveries by Tweedy's method, which consists in the internal and external use of quinine; nevertheless, the results were not as rapid as in the cases described by Mr. Jessop.

Extraction of the Lens in Myopia; a Case of Myopia of 25 D.

MR. WRAY.—I think that extraction of the lens in myopia is indicated under certain circumstances, but not in childhood if the myopia is less than 10 dioptries, nor in an adult when it does not exceed 12 dioptries. The object of the operation is: 1st, to prevent detachment of the retina; 2d, to arrest the progress of choroidal lesions; 3d, to allow persons with high degrees of myopia to work at a convenient distance.

These conclusions are based on 123 cases, with a total of 246 eyes examined, among which were found the accidents of detachment and diminution of vision from lesions of the choroid. He thinks that detachment in high degrees of myopia is less to be feared than changes in the membranes of the fundus of the eye, and therefore the operation does not seem objectionable to him, although he has seen detachment follow after extraction of the lens in myopia of 30 D.

Mr. Spencer Watson hesitates to remove the lens as a remedy for myopia. He does not see how this procedure will arrest the progress of the myopia. The vitreous humor, which is diffuent, is a source of danger.

Mr. Marshall had seen, in one case, detachment as the result of such an operation, and in another suppuration of the eyeball.

Mr. Rockliffe had seen an acute iritis consecutive to extraction.

Mr. Lang, in five operations, had had two detachments of the retina. He therefore rejects this operation.

Visual Acuity in Public Service.

MR. MACKAY thinks that an examination of the sight is of great importance in many of the public services. Examinations are frequently insufficient or performed by incompetent persons. It is especially so in the merchant marine and railway service.

Mr. Doyne claims that except in the navy, the examinations are farces. Candidates are frequently admitted with myopia double that fixed by the regulations.

Messrs. McHardy, Bickerton, Priestley Smith, Critchett, Ridley, and Lanz took part in the discussion.

THE MEDICAL AND SURGICAL SOCIETY OF BORDEAUX

*Session of January 25.***Keratitis and Dentition.**

DR. SOUS read an article on this subject. A child nine years of age was attacked in 1893 with diffuse keratitis in the right eye and hydrarthrosis of the knee on the same side. In 1894 a temporary episcleritis appeared in the left eye, followed by a diffuse keratitis. Applications of warm water to the eye produced pains in the left superior maxilla, in which the first molar was growing in a false direction. The temporary canine was removed, and the ocular disturbances disappeared in three days.

Dr. Sous discussed the influence which rheumatism, syphilis, and dental development could have exerted on the disease of this child, and was inclined to admit the influence of the latter cause.

Dr. Armaignac.—Corneal opacities are of varied character, and their study is far from being completed. In several cases where episcleritis advanced progressively all around the cornea a corneal infiltration may be seen to follow it and to disappear behind in proportion as it advances, without leaving any traces. This is not keratitis, but a trophic disturbance caused by a deep inflammation in the pericorneal sclero-conjunctival region. We do not as yet know the exact character of this corneal disturbance, and it may disappear completely in several days, as it may also persist in places for weeks or months, or even indefinitely.

These temporary disturbances of the cornea in episcleritis seem to be analogous to that observed by our colleague in his patient, who had had episcleritis. As for the relation which may exist between the corneal infiltration and the dental displacement, it is certainly curious, and it seems unreasonable to regard it as a simple coincidence, considering the rapid disappearance of the opacity immediately after the extraction of the tooth.

The sympathetic reflex which exists between the eye and the teeth is well known, and if the anatomical reason is not clearly explained, the pathological fact has been demonstrated. The case of Dr. Sous, while it is unique, is nevertheless true, and I am of the opinion that the eye was probably predisposed by the former episcleritis, but that the dental displacement was the determining cause of the corneal disturbance.

Dr. Dunogier.—According to the dentist, the tooth showed no pathological lesions, no periostitis, and no caries. The root had commenced to be reabsorbed, but there was as yet no decay, and, consequently, no pain or inflammation at the root of the tooth.

In the light of new doctrines, I have become somewhat exacting from a pathogenic standpoint; it seems, then, difficult for me to allow that the reabsorption of the root, a purely physiological phenomenon, could have caused inflammatory disturbances in the eye, and which in any case were slow to show themselves, as several milk teeth had already been lost and replaced without accident.

I think, then, that especially considering the antecedent history of the patient, this should only be considered as a simple coincidence.

Dr. Rolland.—I see no relation of cause and effect between pain relieved by the extraction of the first deviating molar and a diffuse keratitis which disappeared at the same time, as in the case which Dr. Sous has described.

The case reported by our colleague and its termination is only the result of a curious and interesting coincidence.

I cannot admit that two organs with such distant anatomical relation can pathologically influence each other. •

The cornea is enervated by the ciliary plexus, which comes from the ophthalmic ganglion, which comes from the ophthalmic nerve of Willis, arising in the Gasserian ganglion.

The small and large molars are enervated by the superior maxillary nerve, forming the posterior and superior dental nerves, which arise before the superior maxillary nerve passes through the infra-orbital canal.

To explain their action, then, it is necessary to invoke a centripetal impression which shall reach the Gasserian ganglion to return to the cornea, or from the cornea by the same root to the little molar.

As for the pains in the canine fossa, arising in the infra-orbital plexus, the same anatomical obscurity exists. At its exit from the infra-orbital foramen several nerve filaments go to supply the lid and conjunctiva, but none of them reach the cornea.

There could, then, be no possible relation.

There could likewise be no communication on the part of the lymphatics or the circulation.

Dr. Sous.—Was the corneal disturbance caused by episcleritis? In this disease, as Dr. Armaignac says, a corneal opacity known by the name of sclerosis is seen in the neighborhood of the sclerotic. This opacity has peculiar characteristics. It is limited by the border

of the cornea, its borders are clearly defined, and the corneal epithelium was normal. In my patient the corneal disturbance did not accompany the episcleritis, but succeeded and replaced it. It was not situated at the border of the cornea. It invaded, from the start, the entire half of the cornea. The epithelium was affected, and the diffuse infiltration at the borders showed a progressive process. This was, then, not a corneal sclerosis, but an active keratitis.

Did dentition play any rôle whatever? Drs. Dunogier and Rolland think not. Dr. Dunogier founds his objection on the absence of dental caries, and Dr. Rolland only sees in the recovery a coincidence following in the course of a rheumatic affection.

Applications of warm water to the eye always produced pain at the situation of the tooth, and it was the appearance of this symptom that called attention to the condition of the superior maxilla. These pains could only be attributed to a reflex action of the fifth nerve, which enervates both the eye and the teeth.

CLINICAL SOCIETY OF LONDON

Session of January 5.

Detachment of the Retina in Granular Atrophy of the Kidney.

MR. WEST described two cases of granular kidney accompanied by detachment of the retina, an accident of rare occurrence in atrophic nephritis, as these are the only cases of the kind which the speaker has seen among a large number of ophthalmoscopic examinations in cases of Bright's disease.

The first case of Dr. West was a woman twenty-two years old, who for nine months had suffered from headache, vomiting, and diminution of sight. Seven years before she had had a severe attack of acute nephritis. When the speaker saw her for the first time she showed the usual symptoms of granular kidney, in which was included albuminuric retinitis. Six days after her admission to the hospital a general purpura appeared, which disappeared in a short time. Five days later a detachment of the retina was found of non-hemorrhagic origin, which rapidly extended to the entire retina, with the exception of its superior segment. In three weeks a retrobulbar hemorrhage occurred which produced severe pain. The patient left the hospital in this condition and was lost sight of.

The speaker's second case was that of a young man suffering for two months with vomiting and headache, and who in six days became blind. A well-marked albuminuric retinitis was found, with all the other symptoms of granular kidney. Seventeen days later the retina became detached, and a short time after, the patient died.

Mr. Coupland considers the prognosis of albuminuric retinitis as very grave, since from his clinical experience patients hardly live one year after an ocular lesion.

Mr. Hale White said that he had seen a man with an albuminuric retinitis unaccompanied by any notable disturbance in vision. The patient left the hospital considerably improved, to return some time after with other symptoms of Bright's disease. At that time, no further abnormal disturbances were found in the eye. This was the only case in which Mr. White had seen ocular lesion of nephritic origin disappear completely.

The speaker also described the case of a man who came for consultation with a hæmatoma of the ear in whom albuminuria was found. Three months after, he was seized with uræmic symptoms.

Mr. White then called attention to the pathological fact of Bright's disease that interstitial nephritis in people about thirty years of age assumes a singularly rapid development, suggesting the idea that these cases form a special clinical group.

Mr. West also considers the prognosis of albuminuric retinitis as most grave, patients only surviving a few months after this ocular complication. The speaker has seen vesicle hemorrhages occur in the course of interstitial nephritis; he at one time saw an abundant intestinal hemorrhage without any lesion of the digestive tract, as was ultimately shown on autopsy, but he had never seen hæmoptysis.

MEDICAL SOCIETY OF BERLIN

Session of January 23, 1895.

Albuminuric Retinitis of Pregnancy.

DR. SILEX.—All the peculiarities of albuminuric retinitis in pregnant women are not yet well known. Dr. Silex is in possession of preparations which show the vessels intact.

Its symptomatology and prognosis are very inexactly treated in literature, and its therapeutics have been much neglected. The author has given much attention to this special pathological subject for many years, and has arrived at definite conclusions in regard to the affection.

To form a judgment of a case, it is necessary first to make a critical ophthalmoscopic examination of the retinal arteries. In the first stages of the disease, the central artery is often seen with the erect image transformed into a large white cord. This is produced by dilatation of the perivascular lymphatic space. This change may disappear, but hyaline degeneration of the arteries threatens the canals of the vessels, which may compromise the function of the internal layers of the retina and produce atrophy of this membrane and of the optic nerve. If the vessels are normal, albuminuric retinitis presents little danger. This form of retinitis may arise from an affection of the kidneys during pregnancy, an acute or chronic nephritis the general symptoms of which are early developed. The visual disturbances develop slowly, most frequently in the second period of pregnancy, especially in primiparæ. If they develop rapidly, chronic nephritis must be assumed. After delivery, vision is established more or less completely.

In 22 patients examined during a considerable period, 11 recovered vision more than $\frac{1}{2}$, 10 others remained with a lesser degree of acuity, and five of them were almost blind. This unfortunate result was due to atrophy of the optic nerve, to retino-choroiditis, and to detachment of the retina, which occurred at a later stage in both eyes. These figures are so important, from a social point of view, that Sillex advises interference with pregnancy in all cases where retinitis is found. Its prognosis is indeed uncertain: the women are frequently attacked with eclampsia, and the hope of a living child is but faint. In chronic nephritis, danger to the life of the mother and child settles the question of interference; in case of nephritis of pregnancy, premature delivery is not advocated, as in several cases good vision has returned after expectant treatment.

The condition of the retinal vessels should decide the question of interference. For example, in two pregnant women, at the commencement of the eighth month, one having an acuity of $\frac{1}{18}$, and the other of $\frac{1}{15}$, one might be authorized to perform premature delivery in the first case on account of the vascular changes, while one should wait in the second. It is interesting that Dr. Sillex has been able to find large quantities of albumen in the urine during one or two years

without development of chronic nephritis in several women in whom the retinal lesion had disappeared and the general health had remained good. The long duration of albuminuria has not always a bad prognosis when it can be attributed to a renal affection of pregnancy.

ACADEMY OF MEDICINE OF BELGIUM

Session of January 26.

Organization of a Blood Clot in the Eye.

DR. VENNEMAN.—I have undertaken several experiments with the purpose of improving ocular prosthesis. Retraction of the stump which follows enucleation produces a partial obliteration of the conjunctival membrane, of the muscles, and consequently of the foundation for prosthesis.

I have obtained, first in rabbits, and then in man, by enclosing a blood clot in the eyeball, the hardest and most resistant stumps, by means of the organization of this clot.

I have seen in rabbits (experiments with incomplete evacuation) and in man (melanosarcoma complicated with supra-retinal hemorrhage) the pigmentary epithelial cells proliferate, invade the blood clot, and mingle with the young indifferent cells arising from the proliferations of the fixed cells of the conjunctival tissues.

I am uncertain whether the cells of ectodermic origin are called upon to aid in building up the new conjunctival tissues which take the place of the clot, and that contrary to the theory of the three blastodermic layers.

If I cannot to-day furnish a solution of this question, I think that the method which I have pointed out for solving the problem is capable of producing good results.

MEDICAL SOCIETY OF THE HOSPITALS OF BUCHAREST

Session of January, 1895.

Operative Treatment of Myopia.

DR. J. SIKLÉSSY reported two successful cases of treatment of myopia by a removal of the lens.

1st Case.—A woman thirty-five years old, with myopia of 14 D., and advancing choroidal lesions. The author first performed an iridectomy, and fifteen days later linear extraction of the lenses. Clearing up was rapid in one eye, and slow in the other. Vision in the right eye was 6.50 with + 1 D. The left eye was not examined.

2d Case.—A child fourteen years old was operated upon by dissection, according to the ordinary method.

The author thinks it is not easy to give absolute rules for this operation ; one should be guided by circumstances.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Archives of Ophthalmology

Reviewed by Dr. SULZER.

Vol. XXIII., No. 4.

I.—Traumatic Paralysis of the Abducens Nerve, by Dr. PURTSCHER.

In an exhaustive monograph the author collects all the cases of paralysis of the abducens published up to the present time, with a number of personal observations, and discusses their probable localization. After mentioning the rare cases in which a traumatism separates the tendon of the external rectus from the eyeball, or injures the muscle itself, and the only known case of traumatism of the orbital portion of the abducens, as well as paralyzes from pulsating exophthalmus of traumatic origin, the seat of which is probably in the cavernus sinus, he passes on to the consideration of proper intra-cranial traumatic paralyzes.

The classical cases of unilateral traumatic intra-cranial paralyzes of the abducens have been treated in several recent articles, analyses of which have appeared in these *Annales* (see Vol. CXII., p. 114, and Vol. CX., p. 223). We will not, then, stop to explain the mechanism of basal fractures. In the 46 cases of simple or double intra-cranial paralyzes of the abducens collected by Dr. Purtscher, the paralysis was in 36 cases the direct result of traumatism ; in 19 of these 36 the disturbance persisted, in 9 there was recovery, and in 9 others the final result was unknown. In 8 cases the paralysis was secondary. An autopsy was made in 11 fatal cases, 6 of which were

secondary, the cause of the paralysis being abscess of the brain in 3 cases, induration in 1, and neoplasm in 2. The primary bilateral cases were ordinarily caused by hemorrhage at the base of skull, while the secondary cases were usually nuclear, due either to a softening of the brain at the seat of the traumatism, to a cerebral abscess, or to neoplasms. It may happen that the first abducens is paralyzed by a hemorrhage at once, while the second one is affected later from softening.

The occurrence of primary or secondary cortical paralysis is possible.

The optic nerve was affected in almost one-quarter of the cases, most frequently from a fracture involving the optic foramen. Bilateral lesions of this nerve are to be referred to fracture of the sella turcica. In only one case of the 13 of bilateral paralysis of the abducens was a visual disturbance noticed, and even this one was not certain.

The oculo-motor nerve was only affected three times, and the trochlear but once, in the 47 cases.

The trigeminal nerve was paralyzed in 5 cases. It was always primary in unilateral paralysis of the abducens, and always occurred on the same side.

In 7 cases of unilateral paralysis of the abducens there was facial paralysis. In 6 of these the two paralyses occurred on the same side. In 1 they were opposite. The same nerve was paralyzed in 4 cases of bilateral paralysis of the abducens. Three of the 11 cases of facial paralysis were secondary. The primary cases were probably the result of longitudinal fracture of the base of the cranium.

The acoustic nerve was affected in 2 cases of bilateral paralysis of the abducens, a lesion which is to be referred to a fracture of the base.

An examination of these facts shows the comparative frequency of bilateral paralyses. In cases of paralysis of the abducens, bilateral paralysis is found in the proportion of 4.7%, while in traumatic cases it reaches the proportion of 28.3%. The complications of traumatic paralysis of the abducens depend on the direction of the traumatic force. A force acting in a diagonal direction on the base of the skull may cause a fracture running the length of the petrous portion of the temporal bone, and extending in a diagonal direction through the body of the sphenoid to the optic foramen opposite. The other optic foramen may be injured at the same time by a second fracture, beginning at this point, and running parallel to the former fracture.

A transverse fracture of the petrous portion of the temporal bone would be caused by forces acting in the line of the sagittal suture. When the occiput is forced down upon the spinal column the fracture surrounds the foramen magnum. In conclusion, a very interesting fact was mentioned. In persistent traumatic paralyses of the abducens a rapid contraction of the antagonist is developed. This contraction is not found, according to Mauthner, in congenital paralyses of the abducens.

II.—Traumatic Paralysis of the Abducens Nerve,
by Dr. FRIEDENWALD.

The author adds to the preceding article the cases of paralyses of the abducens published since the article of Dr. Purtscher appeared in the German edition of the *Archives of Ophthalmology*. They are ten in number, and were reviewed in the *Annales* at the time of their publication. An eleventh unpublished case was one which came under the author's observation. The paralysis of the abducens was bilateral, without any other nerve disability, excepting partial paralysis of the sensory portion of the right trigeminus. The paralysis of the sixth pair was secondary, and gradually disappeared, while the facial anæsthesia persisted for a long time. The patient, forty years of age, had his head violently compressed between two railroad cars. A hemorrhage from the nose and ears was the only external symptom of traumatism which the patient presented on admission to the hospital in an unconscious condition. The left pupil was larger than the right. The fissure visible in both auditory meati left no doubt of the diagnosis. On the fifth day a paralysis of the left external rectus made its appearance, and at the end of the third week the right external rectus was likewise affected. This paralysis disappeared in the left eye six weeks after the accident, and a little later in the right eye.

In 116,000 patients examined at Hirschberg's clinic, 1,500 cases of muscular paralyses were found, of which 438 were cases of paralyses of the abducens. Of this number, 32 were congenital paralyses, and 406 were acquired. Of the latter, 21 were traumatic, all of these being unilateral. Of 97 cases of fracture of the skull (48 of the base, 49 of the root) treated at the surgical clinic of Professor Bardeleben, at Berlin, there were only two cases of paralysis of the abducens, while the facial nerve was affected in 22 cases.

III.—A Case of Scleritis; Microscopic Examination,
by Dr. KOSTENITSCH.

A case is reported in which the sight of one eye was lost at the age

of twelve years, optico-ciliary neurotomy was performed at the age of twenty-four, and seven months after the neurotomy the eye was enucleated. There were, previous to the enucleation, two typical scleral nodules, one below and to the nasal side, and the other on the temporal side.

On microscopical examination, the vessels of the conjunctiva were found to be increased in number and in size and filled with blood. The lymph channels in the superficial layers of the conjunctiva were dilated, and often contained granular masses, which took the hematoxylin stain, but were not colored by the methods of Loeffler and Gram. The same condition existed in the vessels of the sclerotic. In the sections through the lower outer quadrant of this membrane leucocytes occupied all the layers of the sclera and formed at various points small nodules and tracts. At some points where the cellular infiltration was particularly well marked were found slight hemorrhages in which the red corpuscles had undergone changes, while the leucocytes were polynuclear. The fixed cells of the sclera were increased in number, but the fibres showed no changes. The corneal epithelium was cloudy and contained leucocytes. Descemet's membrane, which had lost its endothelial layer, was partially detached from the cornea.

The author considers these changes in the cornea as secondary and consecutive to the scleritis.

IV.—On the Corneal Suture in Cataract Extraction,
by Dr. KALT. (See *Annales d'Oculistique*, Vol. CXII., p. 271.)

V.—Further Anatomical and Clinical Contributions to the Study of Central Scotomata in Affections of the Optic Nerve, by Dr. SACHS.

In a former article it was demonstrated that the most vulnerable point of the retina for toxic influences and other diseases is the maculo-papillary bundle situated near the centre of the retina on the temporal side. It lies in a horizontal direction from 1° to 8° from the fixation point. Its vertical breadth is the greater, and is situated mostly below the horizontal line. Within these narrow limits the scotoma acquires its greatest development and leaves its last traces. This portion of the retina, which the author calls "the nuclear spot," is situated between the point of fixation and the blind spot.

Dr. Sachs has had the good fortune to make an autopsy on a patient who had had a very pronounced toxic amblyopia, the symptoms of which had been very carefully noted for fifteen months. Visual disturbances, characteristic and pronounced when the patient

was first seen, improved greatly before death. Microscopical examination, however, showed marked histological changes. The papilla, at first congested, presented later a pallor in the temporal portion. Death was caused by a pulmonary phthisis.

The most pronounced changes in the fibres of the optic nerve were found at the point of exit from the optic foramen, from which point the pathological process seemed to have spread to the other portions of the nerve. Here the maculo-papillary fibres, the paralysis of which had caused the characteristic scotoma, were so arranged that in transverse section they assumed the form of an ellipse with the longer axis vertical, the centre of which nearly coincided with the axis of the nerve. The fibres of the temporal half of the macula are from the nasal side of the centre of a transverse section of the nerve. The axis of the nerve does not coincide with the fibres most changed. The fibres of the "nuclear group" are situated on the temporal side of the axis of the nerve. The arrangement of the affected fibres present, in relation to the axis of the nerve, an asymmetry identical with that shown by the perimeter for the scotoma.

The fibres of the temporal portions of the papilla showed a grayish color on ophthalmoscopic examination, but their function was almost unimpaired during the months which preceded the death of the patient. This condition explains the cases in which pallor of the optic disc is found without visual disturbance.

At the bulbar termination of the optic nerve the microscope revealed a considerable diminution of the axis cylinders in the affected bundles. Further back these bundles also showed an increase in the number of nuclei of the neuroglia cells. The layer of nerve fibres of the retina were atrophied, and the ganglionic cells seemed smaller than normal. In the macular region they were, however, well developed.

In addition to the changes of the nerve elements, the sections showed inflammatory changes in the sheath of the optic nerve. Its connective tissue was hypertrophied, especially at a point a few millimetres behind the lamina cribrosa. A large vein at the orbital opening of the optic canal showed every sign of a severe periphebitis.

The histological changes in the papilla explain directly the pallor of the external portion on ophthalmoscopic examination. An increase in the amount of cellular tissue in the lamina cribrosa increases the reflection of light from this membrane; the same effect is produced by diminution of the nerve element. Pallor of the temporal portion may also be accentuated by hyperæmia of the nasal portion.

VI.—Report of a Case of Thrombo-Phlebitis of the Central Retinal Vessels with Necropsy, by Dr. WÜRDEMANN.

A boy became suddenly blind in the left eye in January, 1893. Two weeks before this he had had an attack of measles, from which he had completely recovered at the time of the loss of sight.

Ophthalmoscopic examination revealed the existence of complete closure of the central vein. The optic disc and surrounding retina were apparently filled with extravasated blood. Following the direction of the nerve fibres, hemorrhages of a flame-like character were seen. The borders of the disc were blurred.

The absence of prominence of the optic disc, the sudden loss of sight, and the oedema of the macular region excluded the idea of neuro-retinitis. As the arterial circulation had not disappeared several days after the appearance of the visual disturbance, the diagnosis of embolism of the central artery was also inadmissible. The veins, too, were more engorged than in the case of embolism.

After iodide of potassium and tonic treatment for a month, the patient was again examined. The fundus of the eye had cleared up, and the position of the former hemorrhages was only recognizable by the characteristic gray color. The optic nerve was white and atrophied. In place of the arteries were found only white cords. The veins contained clotted blood.

One year later, violent attacks of glaucoma occurred. A new-formed membrane situated just behind the posterior surface of the lens prevented ophthalmoscopic examination. Enucleation was performed. Microscopic inspection revealed connective tissue formation in the vitreous near the lens. Under the microscope the ciliary region showed marked hyperplasia of connective tissue. The retina and the choroid showed connective tissue degeneration, the former sending out prolongations of connective tissue into the vitreous. Transverse sections of the optic nerve very clearly showed that the sudden loss of vision was due to a thrombo-phlebitis of the central vein. This process produced a perivasculitis which caused the optic atrophy by hypertrophy of the interstitial cellular tissue of that nerve. The artery was completely obstructed by a granular mass of degenerated white and red corpuscles, surrounded by a fibrous capsule. The vein was also obstructed with fibrous exudate containing only a small number of blood corpuscles.

The American Journal of Ophthalmology.

Reviewed by Dr. SULZER.

1894.—Vol. XI., No. 1.

I.—**Amblyopia from Suppression of the Visual Image,** by Dr. WALTER A. JOHNSON.

At the last session of the American Ophthalmological Society Dr. Johnson reported an interesting case of convergent strabismus, in which the deviating eye, which was amblyopic (vision for fingers at 6 feet), had regained its normal vision in nineteen days after the loss of the non-deviating eye, the acuity of which had been normal (see *Annales d'Oculistique*, Vol. CX., p. 198). The author had occasion to examine another case of this description. A man thirty years of age had had an inward squint in the right eye since his youth. He had been operated upon at the age of seventeen years, the result of which was that the former permanent squint had become periodic. In August, 1893, the left eye was seriously injured by a piece of iron, which made a penetrating wound of the cornea 10 millimetres in length. At that time, vision in the right eye was found to be $\frac{3}{8}$ without improvement by glasses. Three days after, vision in the right eye had become $\frac{3}{8}$; that is, normal. In the left eye a traumatic cataract formed. Large characters could not be read with the right eye, formerly the deviating one, previous to the injury. It was not until the 12th of September that, after continued improvement, Jaeger No. 1 could be read at a distance of 10 feet. At this time the left (injured) eye counted fingers at a distance of 4 feet. On the 21st of September the patient complained of lack of certainty in walking and difficulty in localizing objects. It seemed that the occlusion of the left eye improved the symptoms. Despite its weak acuity (fingers counted at 4 feet), this eye seemed to interfere with the function of the other.

II.—**Exophoria,** by Dr. DUNN.

Miss X——, forty-seven years of age, had been troubled with her eyes since she was sixteen years old. Reading or any kind of fixation at a short distance caused severe headache which would last thirty-six hours. She was subject to frequent attacks of hysteria. There were, among other symptoms, severe and obstinate muscular spasms, and two extremely painful points, one situated at the top of the head, the other at the nape of the neck. The eyes, which showed a hypermetropia

of 0.75 D., were normal. In 1893 reading had become impossible. After reading a few minutes, everything became as black as night. Such attacks disappeared in one or two minutes, only to recur when the patient again attempted to read. The retina was so sensitive that a short ophthalmoscopic examination produced a headache which lasted for several days. Abduction was 7° , adduction from 10 to 12° . The effort necessary to overcome a prism of 12° brought on nausea, which lasted for some time. There was an exophoria of 3° .

Headache was produced every time that the patient tried to do any near work. But resting the eyes did not completely cause the disappearance of this trouble. On one occasion, after several days of comparative ease, the patient, having dictated letters, received friends, and listened to reading, had a headache in the evening, which became very intense before morning, as she spent the night comparing mentally the notes of a piece of music from a sonata which she knew by heart with a later composition. This mental effort caused an intense headache, which lasted thirty-six hours.

These headaches were always accompanied with painful sensations in the eyes. The author thinks this combination always indicates the existence of ocular trouble, which in this case was represented by the exophoria.

Vol. XI., No. 2.

I.—Sub-conjunctival Injections, by Dr. ALT.

The author has made numerous sub-conjunctival injections with a 1 to 1,000 sublimate solution in the dose of two minims, with varying results, without ever having had disagreeable accidents. Numerous experiments have convinced him that injections of water or boric acid have no curative effect.

The most successful result was obtained in a case of double recurrent iritis. The patient, twenty-eight years of age, had been treated for five years by the most renowned oculists, who had administered atropine, salicylate of soda, and prolonged mercurial treatment. Each attack lasted from three to six weeks. On the 13th of January, 1893, a sub-conjunctival injection was made in the right eye, which had been attacked four days previously with a severe iritis, which had increased in spite of the ordinary treatment. The night after the injection the patient slept well for the first time. On the next day all the synechiæ were broken, and the pupil was dilated to its maximum. The patient resumed his occupation. Five weeks later an attack of iritis in the left eye was treated in the same favorable manner, with a sub-conjunctival injection of sublimate. Since

that time—that is, thirteen months—the patient has had no more attacks.

If, in the different varieties of iritis, the results are not always as successful, they are certainly superior to those obtained by the ordinary treatment. In severe irido-choroiditis the duration of the disease is considerably shortened by sub-conjunctival injections of sublimate. This treatment is equally applicable to exudative choroiditis and central retino-choroiditis. At first the author feared to make injections in cases where there was considerable inflammation, supposing that it would increase it. Experience has taught him that, instead of increasing, injections of sublimate diminish, the pain in these cases.

II.—**A Petrified Eye**, by Dr. LYDSTON.

In 1886 a fossil of the form and size of a human eye was found at the mouth of the Knife River, on the northern shores of Lake Superior. Two sections made by a lapidary revealed the principal membranes of the eye, infiltrated with the crystalline matter. The anterior chamber seemed to have contained a hyphemia. The author concludes that this was probably the eye of a saurian of the carboniferous era (*labyrinthodontes*).

Vol. XI., No. 3.

I.—**Does Hyperopia Bear a Causative Relation to Strabismus?** by Dr. C. M. HOBBS.

The author severely criticises the theory of Donders, which explains convergent strabismus of hypermetropia as strabismus produced by the excess of convergence necessitated by the hypermetropia. While recognizing the relative frequency of hypermetropia in persons with convergent strabismus, he recalls the facts no less established that the great majority of hypermetropes are not strabismic, and that a large proportion of persons with convergent strabismus are not hypermetropic; also that hypermetropia may be associated with divergent strabismus. He considers, then, the relation between accommodation and convergence as acquired, being established and modified according to the needs of binocular vision. The author refers strabismic deviation to a disturbance of binocular vision, for it is the latter which produces the proper positions of the eyes. When this is at fault, two things may occur: A convergent impulse goes from the cortical visual centre to the two eyes, and the eye stops when the fixed point falls in the centre of the central fossa, while, for the eye which does not take part in binocular vision, this arrest is defective, whence convergent strabismus. In other cases, the eye ex-

cluded from binocular vision does not receive the convergent impulse—divergent strabismus. The dependence of the exact position of the eyes on binocular vision may be demonstrated by the following experiment: When one looks at a star, one eye being covered, double images are perceived at the moment that the hand is withdrawn from the covered eye. The false image will immediately move, ordinarily in a curved direction, to unite with that of the fixing eye.

II.—Corneal Transplantation; the Cause of Failure, and the Remedy, by Dr. W. J. COLE.

The article of Dr. Cole contains the description of an operation which has never been performed, for evident reason. The author proposes to transplant the cornea of an animal, preferably of a dog, in its entirety, and to attach it to the eye of the patient by the aid of four conjunctival flaps, after having resected the entire opaque cornea. The piece to be transplanted would have the form of a Greek cross with triangular branches. The crossing of the branches to be occupied by the cornea to be transplanted. The cornea to be put in place of the resected cornea, and the four conjunctival flaps fixed with a suture to the sclerotic, previously denuded of its conjunctiva in a manner corresponding to the shape of the flap.

III.—The Action of Hydrochlorate of Scopolamine, by Dr. T. R. POOLEY.

Experiments lead the author to different conclusions on several points from those stated by Dr. Raehlmann on the action of scopolamine (see *Annales d'Oculistique*, Vol. CXI., p. 411, and Vol. CX., p. 63). The latter thinks highly of scopolamine in corneal suppurations, and the absence of an increase of intra-ocular tension after its instillation in eyes menaced with glaucoma, or subject to a slight increase of tension, he regards as qualities which favorably distinguish it from atropine, which it surpasses as a mydriatic, while it is less toxic for the conjunctiva; also on the general ground of economy. Three patients for whom Dr. Pooley had prescribed a 1 to 500 solution of scopolamine, to be instilled in the same way as a 1 to 100 solution of atropine, presented serious toxic symptoms. One case is reported in full: A young girl, thirteen years of age, was seized with violent delirium after the instillation of six drops in each eye. The pupils were fully dilated, and the lips and muscles of the face were tonically contracted. The pulse varied from 120 to 130, and the heart action was very rapid and irregular. Walking was impossible. There was no sensation of dryness in the throat.

In a case of serpiginous ulcer it was necessary to replace the scopolamine with atropine, on account of the excessive irritation which it produced. In a case of traumatic suppurative keratitis its action was, on the other hand, excellent, and in numerous other cases of corneal affections it was satisfactory.

Vol. XI., No. 4.

I.—A Pigmented Band Crossing the Pupil, by Dr. T. MURRELL.

The author discovered in a woman twenty-three years old a pigmented band crossing the pupil a little below its centre. This band was of a brown color, identical with that of the iris. It was inserted into the borders of the pupil, dividing, just before its insertion, into three separate bands on the nasal side and two on the temporal.

Vol. XI., No. 5.

I.—Visible Circulation in the Retinal Vessels in a Case of Thrombosis of the Central Vein, by Dr. S. C. AYRES.

A patient forty-eight years old suddenly lost the sight of the right eye during an attack of gout, after having had several attacks of temporary blindness in this eye on the preceding days. When the eye was examined, nine days later, the pupil was found greatly dilated. There was perception of light only in the lower external quadrant of the visual field. With the ophthalmoscope, the classical picture of thrombosis of the central vein was seen. In the neighborhood of the optic disc, by carefully observing the secondary branches of the retinal veins, the motion of the blood column was easily seen, which was interrupted at different points by white spaces. In the arteries there was no motion of the blood visible.

One week later, the veins were still more distended, but all motion had ceased. The œdema of the retina had diminished. There was still perception of light.

II.—Albuminuric Neuro-Retinitis in Pregnancy and Its Treatment, by Dr. L. R. CULBERTSON.

After describing a successful case, the author insists on premature delivery in serious cases of albuminuria in pregnant women.

III.—A Case of Puerperal Albuminuric Neuro-Retinitis with Enormous Amount of Exudation; Recovery; Subsequent Pregnancy and Parturition at Term without Anæmic Symptoms, by Dr. ALT.

The author was called, in 1891, to a patient twenty-six years of age,

on account of a marked diminution in vision. The patient had been delivered two weeks before of a strong and healthy child. Vision had begun to diminish two months and a half before delivery. One month before she had had a violent attack of convulsions, and during the last week her legs were swollen. Delivery had produced no convulsions. Vision was $\frac{8}{100}$ in the left eye, and $\frac{14}{100}$ in the right. With the ophthalmoscope, the entire fundus of the eye except the most peripheral portions was silvery white. The diagnosis was clear without examination of the urine. In August, 1892, only slight traces of the former ophthalmoscopic picture were found: irregular pigmented patches in the region of the macula, pallor of the disc, and contracted retinal vessels. In March, 1893, a second delivery without accident. No albumen in the ninth month of pregnancy. (The ophthalmoscopic picture corresponds perfectly with a malarial poisoning. This supposition would better account for the later behavior of the disease.—SULZER.)

Vol. XI., No. 6.

I.—Foreign Bodies in the Orbit, by Dr. JOHNSON.

(See *Annales d'Oculistique*, Vol. CXII., p. 140.)

II.—Headaches, by Dr. O. LANDMAN.

The author attempts to determine the character and behavior of headaches dependent upon an uncorrected error of refraction. According to him, migraine is only rarely caused by error of refraction, even when it is accompanied by this. It is especially uninterrupted headache which is caused by some ocular defect. It is more frequent in women than in men, and may generally be localized. Uninterrupted diffuse headache is usually caused by a general disturbance. If the patient complains of headache in the eyes, or of pain extending from the eyeballs to the head, or surrounding the eyes after work, or situated behind the eyeballs, or of exasperated attacks in the evening, in general, of painful symptoms yielding to repose, it is probable that the cause resides in the eyes. The author thinks that it is refraction, and not a lack of equilibrium of the motor muscles of the eye, which produces headache. Two hundred cases of ocular headache present the following subdivisions of localization: eyebrows, 41%; top of the head, 20%; occipital, 12%; occipital frontal, 8%; temporal, 8%. In a single case, the headache was general. The fore-

head and the vertex, and the occiput and the vertex, were each thirteen times the seat of pain. Occipital headache was frequently accompanied with stiffness of the nape of the neck.

Vol. XI., No. 7.

**I.—A Case of Suppurative Panophthalmitis Following
Dissection of a Capsular Opacity, by Dr. THEOBALD.**

Reabsorption of a double zonular cataract had been brought about by repeated dissections, which had only once produced a reaction greater than usual. In spite of all antiseptic precautions, dissection of a capsular opacity in the left eye produced a violent panophthalmitis. The patient was forty years of age.

**II.—Can Albuminuric Retinitis in Pregnancy Be
Prevented? by Dr. R. L. CULBERTSON.**

Dr. Culbertson refers to the case published in No. 5. He attributes the successful results obtained to the administration of bichloride of gold.

The Ophthalmic Review.

Reviewed by Dr. V. MORAX.

January and February, 1894.

**On Blinding of the Retina by Direct Sunlight: A Study
in Prognosis, by GEORGE MACKAY, F.R.C.S.E.**

The detailed observations of Dr. Mackay are preceded by a complete historical review, commencing with Galen, including the Byzantine emperor, Constantine VII., Galileo Galilei, Reid, Professor at Edinburgh (1761), Baron Larrey, and Mackenzie of the present ophthalmological era.

Every one to-day knows the characteristic macular affections which may follow direct observation of the sun, and which are especially noticed after solar eclipses. The eclipse which was visible at Edinburgh June 17, 1890, and a partial eclipse on June 6 of the following year, were the cause of the seven cases on which the author's article is based. He states that smoked glass does not form sufficient protection.

*March.***On a Rare Form of Bullous Conjunctivitis**, by Mr. G. A. BERRY.

Mr. Berry has observed upon the tarsal conjunctiva of the upper lids marked stellate cicatrices of "dermatitis herpetiformis" in the case of a man who was attacked one year before with herpetiform dermatitis, and who also had cutaneous scars.

*April.***I.—Localized Posterior Staphylomata; Distortion of the Retinal Vessels**, by Mr. RAYNER D. BATTEN.

Circumscribed ectasiæ of the sclera are found not only on the nasal side, but also above and below. They almost always produce an appreciable diminution in vision, especially when they are on the nasal side. This fact is explained by considering the displacement of the retina, which would be greater in the case of a nasal than in that of a temporal ectasia.

II.—Local Ocular Therapeutics by Sub-conjunctival Injections of Sublimate, by Dr. A. DARIER.*May.***A Case of Traumatic Exophthalmus**, by Mr. A. OGILLOY.

The author reports a case of a man who six months before had been thrown down and tossed by a bull. The two eyes were atrophied, as the result of traumatic rupture of the sclera, but on the left side there was also exophthalmus, caused by a fracture of the orbital walls.

Ogiloy has collected the different cases of traumatic exophthalmus, and shows that the cause is not always the same.

*June.***I.—Primary Melanotic Sarcoma of the Eyelid, with Report of a Case**, by Mr. W. ZUMMERMAN.

Cases of primary melano-sarcoma of the lid are very rare. The author has only been able to find five cases reported. In the case which he describes, the patient, fifty years of age, presented on the left lid a tumor of dull bluish color, one centimetre in length, and of oval form. It reached to the lid margin, but made no impression on the conjunctival surface. The skin was adherent, but not eroded. The tumor had commenced six months before. It was excised, and

later a plastic operation was performed. Eighteen months after there was no recurrence. On microscopical examination the tumor was found to be a melanotic spindle-celled sarcoma, incompletely encapsuled, the point of origin of which remains in doubt.

II.—On the Etiology and the Surgical Treatment of Trachoma, by Dr. PIGNATARI (Naples).

July.

I.—On an Instance of Hereditary Glaucoma and Its Causes, by Mr. PRIESTLEY SMITH.

Cases of hereditary glaucoma and of glaucoma attacking several members of the same family have frequently been noticed, but only hypothetical explanations have been given. In the case which Mr. Smith reports, the hereditary glaucoma depended on hereditary smallness of the eyes.

J. B.—, fifty-two years of age, was attacked with absolute glaucoma in both eyes. The horizontal diameter of the cornea was 10.5 millimetres. His daughter, twenty-five years old, had absolute glaucoma in the right eye, which necessitated enucleation, and thus gave the opportunity of making exact measurements of the eyeball. There was chronic glaucoma in the left eye, which improved after an iridectomy.

The enucleated eyeball was 3 millimetres smaller in all its diameters than a normal eye. The corneal diameters were 2 millimetres shorter than ordinarily. The lens, on the other hand, was relatively larger. Its horizontal diameter was 9 millimetres, its antero-posterior, 6.5 millimetres, while in the normal eye the diameters are 8.5 millimetres and 6 millimetres.

II.—The Inclinator in Ophthalmology, by Mr. ARTHUR E. PRINCE.

August.

I.—Criticism Concerning Recent Views as to the Secretory Function of the Ciliary Body, by JOHN GRIFFITH, F.R.C.S.

The experiments of Deutschmann, Ehrlich, Schoeler and Uhthoff, Leber, Lepat, Memorsky, and others have sufficiently demonstrated that the formation of the aqueous humor takes place in the ciliary region. Nicati gives to the ciliary portion of the retina, as well as the adjacent pigment epithelium, the name of "gland of the aqueous humor." Treacher Collins has described, in the folds of the ciliary zone,

glandular cul-de-sacs to which he ascribes the secretion of the aqueous humor. Collins' researches are interesting from the fact that he studied bleached sections. The section was treated with chlorine, which decolorized the pigment, and thus allowed a perfect analysis of its histological structure. The glandular tubes described by Collins arise from an error of interpretation. When a horizontal section of the eyeball passing through the ciliary processes is made, it is very difficult not to cut obliquely several folds of this process. The intervals left between the folds then appear in the section like glandular cul-de-sacs. This appearance is still more marked when in its state of post-mortem rigidity the ciliary muscle exaggerates the folds of the corresponding zone.

For this reason Collins states that in the folds of the ciliary body the glands are attached one to the other. The tubular and pyriform glands described by Collins exist at the junction of the plicated with the non-plicated portion of the ciliary body, but they are very few in number. They are formed by the pigment epithelium, and not by the cells of the *pars ciliaris retinae*. Griffith says that these glands are instrumental in forming pigment. They are more abundant in dark-colored eyes; in blue eyes, they exist, but are not so well developed; they are not found in the eyes of albinos, and therefore Nicati, who experimented on albino rabbits, did not describe them. This is also a proof that they are not instrumental in the secretion of the aqueous humor. Nicati admits that exudations from the chorio-capillaris, which is included between the internal vitreous membrane and the intervacular membrane of Sattler, should be directed toward the ciliary region, and there, by a process of metabolism, be transformed into aqueous humor.

Græf has observed that on performing a paracentesis of the anterior chamber of a rabbit's eye, and immediately afterwards examining the ciliary process, the cells covering this process are found distended with a coagulated fluid similar to that which is found in the anterior chamber immediately after its evacuation. Griffith has confirmed this fact on human eyes removed a short time after a penetrating wound, and he considers it as an exaggeration of the normal process of secretion.

II.—*Descemetitis*, by Dr. HERMAN SNELLEN.

In two cases of *descemetitis* in which an increase of tension had necessitated sclerotomy and paracentesis the author found small, short bacilli in the aqueous humor. In one of the cases, a gelatin culture of the bacilli was made. Snellen gives no details of the ap-

pearance of the cultures, or of the pathogenic action of the bacilli. On the other hand, he draws a somewhat premature conclusion that cyclitis is due to the action on the ciliary body of the toxine of bacilli developed in the anterior chamber.

September.

Three Cases of Strabismus with Anomalous Diplopia; Normal and Acquired Point of Fixation in the Same Eye, by Mr. CHARLES HERMON THOMAS.

The existence of a new point of fixation in a squinting eye has been described by Swanzy, Berry, and others. In five cases which Thomas reports there were two centres of fixation: one corresponding to the macula and used in monocular fixation; the other, acquired, which only functionated in binocular vision. Two of the cases were divergent squint, and the third a convergent squint. Operative treatment gave a perfect result from a cosmetic standpoint, but not from an optical standpoint. After tenotomy, there was diplopia corresponding to the newly acquired point of fixation. The author concludes: 1st, that binocular vision is a different cerebral function from that of monocular vision; 2d, that the corresponding points of the two retinas in binocular fusion correspond with the functional point of fixation, and that this point may, or may not, correspond with the fovea; 3d, that suppression of the macular image in binocular vision may be produced because the macular image only has its usual predominance in monocular vision; 4th, that the existence of an additional point of fixation in strabismus is revealed by the fact that when the affected eye is used alone fixation is central, and that if a prism correcting the deviation is placed before the eye the patient complains of diplopia contrary to the rule (crossed diplopia with convergence, etc.).

November.

I.—The Relation of Blepharitis and Ametropia; Analysis of 100 Cases, by Mr. CLARKE.

From his statistical researches made at the London Ophthalmic Hospital, Clarke concludes that blepharitis is essentially a disease of childhood, and that when it is seen in adults it has lasted since childhood. It is the expression of asthenopia caused by ametropia in every case (in 100 cases of blepharitis Clarke only found one emmetropic eye).

Correction of the ametropia is an important point in the treatment of blepharitis. Local treatment is of advantage, but recurrences are the rule if the ametropia is not corrected with glasses.

II.—New Method of Treating Vascularization of the Cornea, by Mr. KENNETH SCOTT.

This method, which the author considers superior to peritomy, consists in incising the vessels penetrating in the cornea with a Græfe knife with longitudinal, not transverse, sections in the cornea. The operation is performed with the aid of a lens. In some cases Scott has cauterized the vessels with a fine point, but the results were less satisfactory than those which came from longitudinal incision.

III.—Cellulitis Following Mule's Operation, by Mr. S. STEPHENSON.

The case was that of a child ten years old, whose eye, lost from a traumatism, was the seat of pain and intermittent redness. The author performed evisceration of the eyeball, and put inside a small glass sphere and sutured the sclerotic. Four or five days after, signs of infection appeared, discission of the sclerotic wound, phlegmon of the orbit. Stephenson admits that the infection might have been produced at the time of the operation.

IV.—A Case of Probable Lesion of the Ophthalmic Ganglion, by Mr. J. TAYLOR.

V.—The Therapeutic Value of Ice in Ophthalmic Surgery, by Mr. MCGILLIVRAY.

December.

I.—Muscular Advancement in Strabismus, by Mr. R. WILLIAMS.

The author recommends advancement with or without tenotomy of the antagonist. The method which he employs consists of making a horizontal incision in the conjunctiva, seizing the tendon on the hook, then passing the thread in the conjunctiva to traverse the tendon perpendicularly, and finally bring it out in the conjunctiva in the neighborhood of the cornea. The tendon is then sectioned at its insertion, and the threads are given to an assistant, while the operator performs a tenotomy of the antagonist. Then the threads are carefully tied. After the operation, the eye should appear to deviate in the opposite direction from the primary deviation, otherwise the effect will be insufficient.

Centralblatt für Praktische Augenheilkunde

Summarized by Dr. V. MORAX.

—
September, 1894.

I.—A Case of Recurring Retrobulbar Neuritis, by Dr. A. MOLL.

The patient is a young man of fifteen, without hereditary predisposition, who in January, 1890, showed signs of retrobulbar neuritis of the right side, pain accompanying movement of the eyeball, color-blindness for red and green, diminution of vision (counted fingers at three metres), without contraction of the field of vision, moderate papillary projection, and venous stasis. Cure in one month, without loss of visual power and without scotoma. Six months later, appearance of the same symptoms in the left eye, then cure in a few weeks. In April, 1891, August, 1893, and July, 1894, new relapses in the left eye, and each time a perfect cure. The papillæ show, however, an atrophied color, but strength of vision normal.

Moll compares this case with recurring idiopathic paralysis of the third pair.

October.

I.—Congenital Affections of the Cornea, by Dr. K. L. BAAS.

Baas reports observing three brothers who showed, at birth (as their parents said), corneal trouble, synechia of the iris, and a high degree of hypermetropia, exceeding 10 D. in two of the patients.

Tchender, Manz, and other authors claim, in explanation of these cases, an intra-uterine inflammation comparable with inflammations which supervene during extra-uterine life.

But Baas does not believe it a case of purely accidental inflammation; he thinks that these inflammatory lesions preserve a certain teratologic character or anomaly of development.

II.—Clinical Contributions to the Study of Neuro-Paralytic Keratitis, by Dr. R. KUTHE.

The first observation relates to a man of forty-one, who, following cranial traumatism, shows paralysis of the right sixth nerve, of the right olfactory, of the hypoglossal, and of the trigeminus of the same

side. Eight days after the traumatism slight superficial trouble with the cornea developed in the right eye, with complete anæsthesia of that membrane. Six weeks later, when the patient appeared at Hirschberg's clinic, there was evidently ulceration of the cornea with iritis without hypopyon.

Kuthe remarks that infiltration of the cornea at the beginning develops under the influence of traumatism and xerosis. During eight days the eye was not covered, and spasm of the lids was less frequent. Later, the affection did not differ from an ordinary ulcer of the cornea.

The second case is that of a child of four years, who, after a fall upon the head, showed paralysis of right sixth nerve, with paralysis of the trigeminus. The child already showed ulceration of the cornea, which, under the influence of fomentations, healed rapidly. The eye remained healthy for a year, then a new attack appeared, which healed as before, under the same treatment.

III.—A Modification of the Operation for Ptoxis, by Dr. MAX PESCHEL.

The author, having to operate on a case of paralytic ptosis accompanying total ophthalmoplegia, merely passed three slightly divergent threads beneath the skin, running on one side into the tarsal cartilage and on the other stopping in the eyebrow, so as to utilize the action of the frontal muscle. The threads were left in place twenty-four hours, and the effect was very satisfactory.

November.

I.—Exudative Choroiditis and Pediculated Polypoid Tumor of the Choroid Simulating Glioma, by Dr. GINSBERG.

A child of three showed signs of glioma of the retina in the left eye. The eye was enucleated, and a detachment of the retina was evident. The choroid showed, at its posterior pole, a small tumor the size of a lentil. Histological examination showed the existence of nodular inflammatory tissue with giant cells, centres of fatty degeneration. The writer describes at length five lesions of the retina and the vitreous humor, but does not speak of any search for tuberculous bacilli, which would have been much more interesting. The idea of a bacillary lesion resulting secondarily in exudative choroiditis does not seem to have suggested itself to his mind.

December.

I.—Accommodative Paresis Treated with Behring's Anti-diphtheritic Serum, by Dr. SCHMIDT-RIMPLER.

Schmidt-Rimpler has treated three cases of accommodative paresis following pharyngeal diphtheria with injections of the anti-diphtheritic serum of Behring. In the first two cases, accommodative paresis accompanied by paralysis of the velum of the palate had lasted three weeks. Cure was complete fifteen days after injection in one case, and in nine days after in a second. The third case is that of a man of twenty-four who appears to have had pharyngeal diphtheria in August; some days later he experienced symptoms of accommodative paresis. In the beginning of September the paresis was already on the way to improvement when an injection of the serum was given. Cure was complete seventeen days after the injection.

The cure seems to have been a little quicker than usual, but the writer does not think he should commit himself on the efficacy of the serum in these cases of diphtheritic paralysis.

II.—A Case of Monocular Diplopia with Double Pupil, by Dr. HIRSCHBERG.

Hirschberg has been able to test the experiment of Scheiner on a patient with polycoria of traumatic origin, and showing no disease of the crystalline lens or its surroundings. At a distance, and when the healthy eye is closed, diplopia exists, with the images placed alongside each other; they are crossed, and the angle of divergence is a quarter of a degree.

The eye is hypermetropic, and when this is corrected diplopia no longer exists. It is true that in a case of polycoria diplopia only manifests itself when the eye is not focussed on a fixed object.

III.—Reduction of the Pupillary Reflex on the Right Side, with Reduction of the Pupillary and Accommodative Reflex of the Left Side, by Dr. O. SCHWARTZ.

The case is that of a man of twenty-five, without syphilitic antecedents, and without cerebro-medullary affection, showing inequality in the pupils. Exposed to light, the right pupil is most dilated, and reacts but feebly to the luminous impression. The left pupil reacts strongly to light.

In darkness the left pupil is most dilated, and contracts but little in convergence or accommodation. According to Heddeus, the iritic branch of the oculo-motorius arises by two roots, one coming from the nucleus of the sphincter, the other from the nucleus of the

accommodative nerve. In this case there may be admitted congenital weakness of the right sphincter nucleus and of the left accommodative nucleus.

IV.—Echinococcus of the Orbit, by Dr. H. RABINOWITSCH.

Dieu and Weeks have collected thirty-three cases of echinococcus of the orbit, and Russian literature contains four other cases. It is, then, of rare occurrence. The case was that of a woman of sixty-four, who, for six months, had had disturbance of vision of the left eye, with exophthalmus and orbital pains. The left eyeball is immovable and pushed toward the upper orbital wall. The exophthalmus is so great that the eyelids no longer cover the cornea, which is so little transparent that no examination of the interior of the eye is possible. Sensation to light remains. Below and outside the eyeball can be felt through the eyelids a hard, immovable tumor, apparently fluctuating in spots, and filling the orbit. Considering the rapid growth of the tumor, the diagnosis was that of malignant tumor, and its extirpation was proceeded with. Beneath the conjunctiva was found a sac adhering so strongly to the eyeball and filling the orbit to such an extent that complete extirpation was found impossible. It was only advisable to remove the anterior third and plug the cavity of the cyst with iodoform gauze. The internal surface of the wall of the cyst was smooth, except for a vesicular projection in its posterior part. The liquid in the cyst contained no albumen. The walls of the vesicle were formed of an investing membrane in regular concentric layers, characteristic of echinococcus.

After the operation the eyeball returned to its place, and transparency returned to the cornea. There was atrophy of the papilla without trouble of the media. The patient counted fingers at a distance of two metres; the motility of the ball is very limited.

Klinische Monatsblätter für Augenheilkunde.

Summarized by Dr. V. MORAX.

November, 1894.

I.—Practical Advice for Young Oculists on the Operation for Cataract.

Pagenstecher fears lest different opinions on the subject of operation for cataract should mislead young ophthalmologists, and lest, in

face of different methods of procedure, they should hesitate at a choice. This is the advice he gives to his assistants : Do not operate upon a patient with even a slight inflammation ; make certain that there does not exist near the eye, in the lachrymal ducts, a source of contamination for the wound made in operating ; examine with care the state of the other eye, and do not interfere in case there are signs of irritation ; if that be atrophied or painful, it should be enucleated, and six or eight weeks should elapse before the operation on the other eye.

If iritis, or glaucoma, or other pathological symptoms exist in the other eye, wait for the return of a normal condition. Do not operate for immature cataract nor without disinfecting the parts involved, the hands, and the instruments. Lift the eyelids with an elevator easily removed. Fix the eye near the cornea. Do not make the incision too peripheral above, and preserve a small bridge of the conjunctiva. The cut should not be too short—about a third of the circumference of the cornea. The perfect linear section is not advisable. Practise iridectomy before incising the capsule. Dividing the capsule from the front is to be preferred, and the capsular forceps should only be employed in a case of strongly marked capsular cataract. Force out the crystalline lens by pressure on the lower side of the cornea, and evacuate the cortical masses by slight pressure on the cornea, or by manipulating the cornea beneath the eyelid. Do not wash out the anterior chamber. If the vitreous humor escapes before opening the capsule, remove the lens with the scoop. This procedure may be followed from choice when the cataract is over-mature and the patient is very docile. Bandages should be sterilized. Do not make dissection of the secondary cataract until irritation has subsided, but then, as soon as possible. Do not introduce the needle into the cornea, but into the limbus at about one millimetre back of the cornea.

II.—On Disease of the Eye Induced by Intestinal Worms,
by Dr. C. MEURER.

In two cases noticed by Meurer, children of eleven and five years, respectively, there was rapidly progressing loss of vision accompanied by headache and vomiting, and characterized by slight optic neuritis with papillary stasis. Ten days after the attack of blindness vision commenced to return, and in both cases recovery coincided with the evacuation of intestinal worms. The writer thinks that he can attribute the cerebral hyperemia and the hydrocephalus which, as he believes, were the cause of the optical neuritis, to a reflex(?) action from the mucous membrane of the intestines.

December.

I.—A Contribution to the Study of the Pathological Anatomy of Polypoid Growths of the Conjunctiva, by Dr. W. ZIMMERMANN.

Zimmermann describes three cases of pedunculated growths of the conjunctiva :

Case I.—Child of twelve years, treated in 1894 for phlyctenular keratitis, which with yellow ointment healed rapidly. In May there appeared on the lower palpebral conjunctiva a small papillomatous neoplasm, without ulceration and without inflammation of the surrounding conjunctiva, supported by a short pedicle.

Microscopic examination of this little excrescence revealed granular tissue with giant cells, covered by a continuous layer of epithelium.

Coloring by Ziehl's fuchsine showed three tuberculous bacilli in one of the large cells. The child presented no other manifestations of tuberculosis, and Zimmermann thinks that it may be a case of ectogenous infection, possibly induced by the applications of the ointment.

Case II.—A man fifty-seven years of age wounded the lower tarsal conjunctiva slightly by a straw. At this point a small papillomatous excrescence gradually developed, which finally gave rise to a slight ectropion with conjunctivitis. A year later a tumor of gelatinous consistency was found, of reddish color and irregular surface, and attached by a short pedicle in the neighborhood of the lachrymal puncture.

Histological examination showed that it was a papilloma. At many points the epithelium showed calcified deposits.

Case III.—A child eleven years of age was subject to repeated and free hemorrhages of the conjunctiva. On the tarsal conjunctiva, near the external angle, a small papillary tumor with irregular surface and short pedicle.

This tumor was formed of fibrous tissue with well-developed blood vessels. The stratified epithelium by which it was covered was in many points calcified. It was a vascular fibroma.

II.—Injections of Iodine in Detachment of the Retina, by Dr. SCHOELER.

Schoeler replies to the article of Wolff (*Arch. f. Ophthalm.*, Bd. XLVII., p. 62). This author has shown experimentally that injection of tincture of iodine in the vitreous humor, far from provoking

adhesions between the retina and the choroid, produces lesions of the vitreous, and may cause ultimate detachment. But Schoeler has never recommended the injection of iodine into the vitreous humor. In his article in 1885 he expressly says that the tincture of iodine should be injected in the pre-retinal space between the detached vitreous body and the retina. Six years' clinical experience has not altered his views. Inflammatory adhesions may be obtained either with iodine or galvanism.

Schoeler then gives the results of the five cases reported in his article of 1889 (Operative Treatment and Cure of the Retinal Detachment). In the first case the cure lasted for four years, but two years ago the patient was lost sight of. The second case was operated upon for cataract two years ago, and vision is better than immediately after the treatment of the detachment. In the third case senile cataract developed, and the vision has diminished; this should be attributed to progressive chorio-retinal atrophy. In the fourth case a cataract developed, and a lacuna persisted in the visual field corresponding to the seat of the detachment. The fifth patient has not been seen for five years. At that time the cataract was well developed, and prevented examination of the fundus of the eye.

III.—Associated Movements of the Upper Lid in a Patient with Coloboma of the Optic Nerve, by Dr. HILLEMANS.

Hillemans reports the case of a patient eighteen years old, with a slight ptosis of the left upper lid without paralysis of its movements.

In this patient, opening the mouth, adduction and abduction of the inferior maxilla were accompanied with a synchronous movement of the upper left lid.

January, 1895.

I.—Etiology and Treatment of Glaucoma, by Dr. O. WALTER.

Scopolamine has been recommended as a mydriatic which does not increase intra-ocular tension, and an attempt has been made to substitute it for the ordinary mydriatic in eyes predisposed to glaucoma, but the number of cases applicable to this treatment is limited. Raehlmann, Illy, and Martelli state that scopolamine does not increase the tension, while Belliarminow is more reserved. Walter reports a case of irido-choroiditis in which instillation of scopolamine seemed to provoke an attack of glaucoma¹: the patient had had, sev-

eral years before, a glaucomatous attack in the other eye. In the second case there was choroiditis without increase of tension. Instillation of scopolamine brought on an attack of glaucoma which necessitated iridectomy. It is proper, then, to be as circumspect in prescribing scopolamine as in the case of other mydriatics. In the first case Walter obtained marked improvement with an anti-gout treatment (piperazine, warm baths, etc.), although the patient showed no pronounced signs of the uric acid diathesis.

II.—Bilateral Gumma of the Orbit, with Autopsy,
by Dr. O. WALTER.

Walter describes the case of a child three and one-half years old in whom an exophthalmus, at first monocular, later bilateral, developed quite rapidly. The exophthalmus became so marked that the cornea was uncovered, and ulcerations resulted, which brought about the destruction of this membrane and purulent disintegration of the eyeball. A hard tumor was felt under the eyeball, reaching to the summit of the orbit, and continuing forward under the skin of the cheek. Soon the tumefaction extended to the temporal and frontal regions. At the same time there was emaciation and marked disturbances of the general condition. Death followed two months after the commencement of the exophthalmus. Diagnosis made during life was that of a malignant tumor of both orbits, and treatment had been purely symptomatic.

At the autopsy, sclero-gummatous lesions of the capsule were found, and in the liver and kidneys, in the diaphragm and pleura, and gummas of the peri-cranium and dura mater. The orbital tumor was composed of periosteal gummas, without change in the underlying bone, which invaded the periosteum of the superior maxillary of the frontal and of the temporal bones.

III.—Pemphigus of the Conjunctiva, by Dr. GLAS.

Glas publishes three cases of pemphigus of the conjunctiva accompanied with general pemphigoid eruptions of the skin and mucous membranes.

General Review of Ophthalmology.

Summarized by Dr. VALUDE.

November, 1894.

I.—**Mechanism of the Action of Iridectomy in Glaucoma,** by Dr. DE VINCENTIIS.

The author begins by opposing the hypothesis of the filtration cicatrix explanation of the cure of glaucoma after iridectomy. We are not sure, he says, of the action of this so-called filtration cicatrix, and the argument regarding it is purely hypothetical. For himself, he thinks that in a case of glaucoma iridectomy acts by the direct action which it exerts on the angle of the iris. When, he says, iridectomy is practised and no synechia exists, the operation has a double effect besides the section made in the membrane of the iris; the entire iris is distended, and a certain amount of traction is exerted on the angle itself, so as, in a certain sense, to produce a spreading apart. It is by these tractions that iridectomy produces a curative effect, and this is so true, says Dr. de Vincentiis, that iridectomy ceases to be efficacious if synechiæ exist which limit the distention.

To give experimental proof which will sustain this hypothesis, the writer treated glaucoma by simply detaching the angle of the iris by means of a blunt instrument introduced at the periphery of the anterior chamber. Success rewarded his attempt.

II.—**Syphilitic Retinitis with Albuminuria,** by Dr. E. BERGER.

■ Observation of specific, classic retinitis, with the circumstance that it coexisted with a chronic nephritis.

January, 1895.

Salicylate of Soda in Exophthalmic Goitre, by Dr. CHIBRET.

The author cites four cases of *Basedow's disease* much improved by use of salicylate of soda; this disease is sufficiently rebellious for us to note with satisfaction any remedy that can affect it favorably.

Dr. Chibret gives the salicylate in doses of five grammes per day, at least, and improvement follows in a few days. However, the medicine should be continued for a considerable period, unless contra-indicated by the appearance of morbid symptoms.

To avoid any disadvantages of the salicylate, Dr. Chibret recommends that it be given four times in twenty-four hours, and in at least a half-litre of liquid; however, if desired, the dose can be reduced from five grammes to two.

IV.—BOOK NOTICES

MEDICAL JOURNALS

Sebaceous Eczema of the Eyelid, and Its Treatment, by Dr. LELOIR. (*Bulletin méd.*, January 20.)

The first stage is characterized by the formation of scales, white, small, pityriasiform, and generally traversed by hairs; little or no itching.

At the second stage there is congestion, moisture, formation of scabs and crusts, gluing the eyelashes, and causing, when detached, superficial excoriations. Loss of eyelashes, styes, suppurative folliculitis. The lashes readily return.

In the third stage, more pronounced dermatitis, palpebral œdema, either generally or limited to the neighborhood of the free border. The lashes are no longer reproduced, for they are destroyed by follicular or peri-follicular inflammation.

At the fourth stage the dermatitis is deeper, with cicatrization and thickening of lids, lashes destroyed or growing irregularly in every direction. Entropion or ectropion.

As for the eye itself, there were found conjunctivitis, congestion, redness, pricklings, hypersecretion of a whitish appearance; in very pronounced cases, kerato-conjunctivitis, ulcers and maculæ on the cornea, pannus, etc.

Treatment: Treat the seborrhœa of the scalp, for it is contagious, and the palpebral seborrhœa is only a complication by inoculation. For the eyelids, resorcin lotions; one or two teaspoonfuls of a liquid solution of resorcin $\frac{1}{4}$ in a half a cup of hot infusion of chamomile, with application morning and night of weak resorcin ointment or

yellow ointment. For the hypersecretion, touch with the stick of sulphate of copper, or mild nitrate of silver. Careful hygiene, ocular and general, especially for arthritic patients.

Recurrent Hemorrhage of the Retina, by Dr. TROUSSEAU.
(*La Clinique opht.*, January, 1895.)

The writer has observed a patient who showed recurrent hemorrhage of the retina, and for which none of the usual causes of hemorrhagic retinitis existed. There was neither sugar nor albumen in the urine, and no heart trouble. A complete examination of the urine showed the existence of uric acid and phosphates; appropriate treatment lessened the tendency to hemorrhage, which has not reappeared since the urine approached the normal.—V.

Retinitis of Paralytics; Histological Notes, by Dr. COLUCCI.
(*Annali di neurologia*, 1894, sheets 3-4.)

The greater number of cases of restriction of the field of vision, of loss of visual power, and of all the other ocular troubles so frequent in paralytics, result from true anatomical lesions. Clinical varieties of ocular difficulties in paralytics, as well as the principal trouble itself, must depend upon the location in which the lesions first and with greatest intensity develop; these varieties depend as much on the variations of the elements which compose the different physiological zones invaded, on the communicating tissues invaded, and on the seat of the obstructed lymphatic ducts.

As to the alterations of the retina in paralytics, three principal anatomical varieties can be distinguished.

First, the commonest and the most characteristic consists in primitive atrophy of the nervous elements of the retina in general, independently of any vascular lesion, and the irregular and variable distribution of the lesions into the nuclei, interspersed among which may be found parts of the retina comparatively well preserved.

The second consists in a predominant alteration of the vessels under the form of an extraordinary proliferation of the fibres and the nuclei of the vascular walls, and finally in the consecutive obliteration of their canals.

The third form is the slowest but the most regular in evolution. This is rather a case of secondary degeneracy, with alterations of the optic centres, and by this very symptom the lesion resembles that

provoked experimentally in animals by resection of the optic nerve.
—BITZOS.

Anterior Sclero-Choroiditis, by Dr. ABADIE.
(*La Clinique opht.*, January, 1895.)

The author studies the disease characterized by attacks of scleritis, accompanied by various troubles of the cornea, which may extend to a rather intense yellow infiltration. The affection is mostly noticed in women, with frequent recurrence, corresponding to the menstrual period. Dr. Abadie thinks that the yellow deposits in the cornea may really be deposits of urates, because the disease essentially resembles an affection of a gouty nature. In fact, the preferable treatment is neither by mercury nor iodide of potassium, but by colchicum.

Two or three granules of colchicum should be prescribed, in doses of a milligramme each, but that dose should not be exceeded. But if in any case signs of intolerance, shown by colic, become evident, they must serve as a warning. The medicine should be given in alternate periods of eight days of rest and eight days of employment; iridectomy will be useful if there be synechia.—VALUDE.

Epithelioma of the Eyelid Treated by Methyl Blue,
by Dr. FAGE. (*La Clinique opht.*, January, 1895.)

The author reports three cases of epithelioma of the eyelid successfully treated by applications of methyl blue in strength of $\frac{1}{5}$.

Even extended epitheliomas can be cured by this method. To expedite a cure, a part of the neoplasm just at its base of implantation can be excised, then the exposed surface should be touched with chemicals; or, after having destroyed the canceroid formation with the hot iron, the treatment can be continued by application of methyl blue.—VALUDE.

A Case of Tenonitis, by Dr. PUECH. (*La Clinique opht.*, January, 1895.)

The case is one of tenonitis offering the two following peculiarities: there existed together with protrusion of the eyeball complete paralysis of the upper eyelid; the second noticeable point is that the patient was recovering from an acute blennorrhagia, which suggests the hypothesis of a gonococcal origin of the disease. Exposure to cold had been so great that this, by itself, might have been claimed as a cause.

Treatment of Suppurative Disease of the Cornea by Sub-conjunctival Injections of Parachlorophenol, by Dr. DOLGANOFF. (*Wratch*, No. 23, 1894.)

The author has made a series of observations on the use of parachlorophenol (liquid solution of 1-2%) in sub-conjunctival injections for the cure of ulcers of the cornea.

These injections are generally easily supported; they result in only slight pain, which lasts for five minutes, and no other complications are observed. The author applied this treatment in six cases of ulcer of the cornea of traumatic origin; the ulcers cleared up and healed rapidly (seven to sixteen days); the injections favorably influenced the progress of serpiginous torpid ulcers which resisted the usual treatment. Moreover, the injections of parachlorophenol had the advantage of lessening or completely doing away with the pain. Though the observations were few in number, the author, notwithstanding, concludes: 1st, injection of paraphenol undoubtedly hinders the spread of suppuration, and considerably hastens cicatrization; 2d, the injections are also recommended on account of their prophylactic action.—MUTERMILCH.

Operative Treatment of Conjunctival Xerosis, by Dr. ANDOFSKY. (*Wratch*, No. 13, 1894.)

In five cases of xerophthalmus due to old trachoma the author applied with success the procedure recommended by Dr. Roudine at the fifth Congress of "The Society of Russian Physicians," consisting in a suture of the free borders of the lids, except in their medial part. In two cases not only did the disagreeable sensation of dryness disappear, but vision was considerably improved; in two other cases improvement was also noticed, but the observation was not carried further; finally, in the fifth case, one of a long standing xerosis, disappearance of the sensation of dryness was observed, but no improvement of vision resulted, owing to the presence of leucoma of the cornea. Such satisfactory results as these from following the process of Roudine induce the author to recommend a larger application in the treatment of xerophthalmosis.—MUTERMILCH.

ANNALES D'OCULISTIQUE

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

CLINICAL AND ANATOMICAL STUDY OF SEROUS OR SIMPLE CYSTS OF THE CONJUNCTIVA

By Dr. **G. ROMBOLOTTI**,

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Observations relative to serous or simple cysts of the conjunctiva are few in number, and, therefore, according to the statement recently made by Panas in his treatise (1), their pathogenesis is yet imperfectly known.

I have no intention of making a classification of these cysts; nevertheless, it has seemed proper, in order to determine the histogenesis of a case of serous cyst of the conjunctiva which came under my observation, to make the following division:

A first variety is composed of those which are situated on the bulbar conjunctiva, and which are of congenital as well as of spontaneous origin.

Saemisch (2) says that these cysts are generally situated near the corneal margin; that usually they are not movable under the mucous membrane, which latter enters into the composition of their walls. They are round in form, with a thin, delicate

(1) PANAS : *Traité des maladies des yeux*. Paris, 1894, Vol. II., p. 281.

(2) GRÆFE-SÆMISCH : *Handbuch der Gesamm. Augenheilk.*, Vol. IV., No. 1, p. 157.

wall of almost perfect transparency, allowing the contents, clear as water, to be seen. Such was the case described by Saemisch.

Cysts have been seen, on the contrary, by some authors, with thick walls which are not movable and are deeply adherent to the episclera (1). Others have noticed that the cyst was movable under the conjunctiva, with which it formed hardly any adhesions. (The Case of Warton-Jones, reported by Mackenzie) (2).

It is difficult to determine the histogenesis of this first variety of cysts. The authors above mentioned do not discuss it.

A *second variety*, which has its seat on the bulbar conjunctiva near the corneal margin, and with almost the same morphological characteristics as those of the first variety, is composed of those which may be traced to a traumatic origin. The cases of this variety recorded in literature are likewise few in number; among the best known, I refer to those of Arlt (3), Schön (4), Zehender and Geisser (5), Uhthoff (6), and Baudry (7). The cases published by Uhthoff deserve special attention, as this author discusses the important question of the histogenesis of these cysts.

In the first of these cases the cysts occurred after an operation for advancement of the external rectus performed for a convergent strabismus. Five weeks after the operation the cyst was visible over the tendon of the advanced muscle, as a small transparent swelling, 3 to 4 millimetres in height, and about 4 millimetres distant from the corneal limbus, intimately adherent to the sclera and covered in its upper third by the tendon of the advanced muscle. Its contents were clear and serous. Anatomical examination showed that the wall of the cyst was composed of connective tissue which showed no peculiar disposition or stratification, and having a covering of pavement epithe-

(1) WECKER and LANDOLT: *Traité Complet*, Vol. I., p. 425.

(2) *Diseases of the Eye*.

(3) ARLT: *Die Krank.*, Vol. I., p. 169.

(4) SCHÖN: *Pathol. Anat. des Auges*. Hambourg, 1829, p. 166.

(5) ZEHENDER and GEISSER: *Die Verletzungen des Auges*. Leipzig, 1864, p. 416.

(6) UHTHOFF. (*Berliner Klin. Wochenschrift*, 1878, p. 729.)

(7) BAUDRY. (*Bullet. Méd. du Nord*, 1882.)

lium of a single layer. There was no trace of a foreign body either in the wall or in the contents of the cyst.

In the second case described by Uhthoff, the cyst, which was also situated on the bulbar conjunctiva, followed a penetrating wound of the ciliary border of the upper lid, which recovered in eight days. Six weeks later, the cyst was present, and was of the size of a bean. The tumor was situated 1 centimetre from the external side of the limbus, in the conjunctival tissue of the eyeball; the conjunctiva was not movable on the wall of the cyst, but intimately connected with it; the contents were serous and transparent; on oblique illumination, three lashes were seen included in the wall of the cyst.

On histological examination the cyst wall appeared to be composed of conjunctival fibrillæ, which had no characteristic disposition, and which were covered internally with a layer of flat epithelial cells.

In the third case, the cyst occurred a few days after the bite of an insect. It was situated 8 millimetres from the internal corneal margin, and was of the size of a small pea, with clear serous contents and of an elongated cylindrical form.

After excision of the cyst, Uhthoff found a delicate pavement epithelium covering the very thin inner wall of connective tissue. There was no trace of vessels, yet the author thinks that this was certainly a dilated lymph vessel, which in consequence of its extreme dilatation had lost its proper vascular structure.

As regards the pathogenesis of these cysts, Uhthoff thinks that a study of the first two cases leaves no doubt that their formation was directly dependent upon the introduction of a lash in the sub-conjunctival tissue. He believes that it was the epithelial cells adherent to the eyelash which were drawn in and became the point of origin of the cystic formation.

In cysts with serous contents there is a suppression of the elimination of the fluid, and the included eyelashes act as foreign bodies.

The third case, according to Uhthoff, was by no means due to traumatism, but was simply a lymphatic dilatation.

As for the diagnosis of these cystic formations, Uththoff thinks that a simple microscopical examination will show whether a conjunctival cyst is formed by the dilatation of a lymph vessel or otherwise, for cysts due to a vascular dilatation are situated in the superficial layers of the conjunctiva, and are always movable on the sclerotic; further, the course of a lymphatic vessel may frequently be followed, in the surrounding tissue, as a thin cord continued in the extremity of the cyst; and again, the form of these cysts is rather elongated than globular. Cysts of traumatic origin, on the other hand, according to Uththoff, have their seat in the sub-conjunctival tissue; they are deep, and in consequence of the inflammatory reaction excited about them, they are firmly adherent to the sclera and to the superficial layers of the bulbar conjunctiva; they are consequently not movable on the mucous membrane.

A *third variety* of sub-conjunctival cysts includes those which are developed in the bulbar conjunctiva from dilatation of the lymphatic vessels of the mucous membrane. They are generally small, like a small transparent worm, or disposed in groups. These formations have been studied by Hirschberg (1). Panas (2) noticed that they were found both in irritated conjunctivæ and in those of normal appearance, and that they resemble lymphæctasias. Although there still exist doubts as to their precise signification, he calls attention to the articles of Stenderer (3), Irme (4), Laskiewicz (5), and Delecueillerie (6), who give no less than nine personal observations, from which it is shown that these cystic cavities may be circumscribed and anastomose with each other; that they are situated under the conjunctiva, and that they generally contain a coagulable fluid. As for the walls, they are composed of a condensed laminated tissue covered with an endothelial layer which is not continuous.

(1) *Klinische Beobachtungen*, Berlin, 1874, p. 1, Fig. 2.

(2) *Traité des maladies des yeux*, Vol. II., p. 267.

(3) *Virchow's Archiv*, 1874.

(4) *Wiener Med. Wochenschrift*, 1876.

(5) LASKIEWICZ. (*Jaresbericht f. Ophthalm.*, 1877.)

(6) *Thèse de Paris*, 1892.

A *fourth variety* of cysts which deserves special classification is formed of those which are developed in the reflected portion of the conjunctiva. I find no mention of these particular formations in the two former principal treatises on ophthalmology (Græfe and Saemisch, de Wecker and Landolt). In the recent work of Dr. Panas (1) the cases of Faravelli and Rampoldi (2) and of Bull are reported (3).

It is to Professor de Vincentiis (4) and his pupils (5) that we are indebted for the important researches from which it appears that their development is due to a cystic dilatation of the acino-tubular glands of Krause. It must, however, be admitted that this interpretation, which is sound and rational in regard to the histogenesis of simple conjunctival cysts, is either not yet generally known or its proper value is not appreciated. Panas, in his excellent treatise, scarcely makes mention of it.

Antonelli (6) makes the following resumé of what is known up to the present time of these formations, which develop, as I have said, by cystic degeneration of the glands of Krause: they may be congenital (Faravelli and Rampoldi), but they are more frequently acquired (de Vincentiis, Moauro) (7).

Their origin is not uniform. It is sometimes due to an obstacle to the elimination of the secretion from alterations of the tissue which is traversed by the excretory canals, sometimes to neighboring tumors, which form mechanical impediments, and sometimes to modifications in the quality and quantity of the secretion itself.

Its clinical aspect is that of a larger or smaller vesicle, situated in the upper cul-de-sac (rarely in the lower), which is prominent

(1) *Loc. cit.*, p. 282.

(2) *Annali d'Ottalm.*, 1880.

(3) *Americ. Journal of Med. Sc.*, 1878.

(4) *Congresso Associaz. Ottalm. Ital.*, Napoli, Settembre, 1888.

(5) MOAURO: Dilatazione cistica delle ghiandole di Krause. Raccolta dei lavori della Clinica Oculistica di Napoli, 1887-1888.—ANTONELLI: Cisti sottocongiuntivali aventi origine delle glandole acino-tubolari. (*Annali d'Ottalm.*, 1890.)

(6) *Loc. cit.*, p. 281.

(7) Cisti congiuntivali aventi origine delle ghiandole acino-tubolari. (*Annali d'Ottalm.*, 1890, p. 467.)

under the skin. It is situated between the lid and the osseous border of the orbital cavity, along the orbito-palpebral furrow, which becomes obliterated, or even gives place to an elevation. On everting the lid its form is seen to be that of a concavo-convex meniscus interposed between the eyeball and the lid. The cyst has the appearance of a more or less tense vesicle, which allows an examination of its contents, sometimes limpid and clear, more frequently of a brownish color. The conjunctiva which covers it is hyperæmic, as well as the skin of the lids, but this is less marked when the cyst has attained considerable development.

After this rapid review of the different varieties of simple cysts of the conjunctiva, I now present the case which came under my observation, and for which I am indebted to the courtesy of Dr. Denti, Director of the Ophthalmological Service of the Milan Hospital:

C. A——, twelve years of age, had been treated for a penetrating wound in the left eye, implicating the cornea and the sclera, with prolapse of the iris and the ciliary body. From the former clinical history it was found that the wound had taken a vertical direction from above downward, and that it occupied the internal superior third of the eyeball, or rather the segment included between the superior and the internal recti muscles. The child left the hospital after a period of acute inflammatory reaction, on the termination of which this note was made: "The eyeball is rapidly becoming phthisical." For four years the eye caused no trouble, until the month of November, 1892, when the child noticed that in the segment which had been injured a small transparent body like a small vesicle was developing, which in five or six months attained the size of a grain of wheat. There was a stationary period, and then from April, 1893, the vesicle slowly increased, arranging itself around the cornea. During this increase the tumor occupied the palpebral opening. The child stated that neither at the commencement nor during its later development did he suffer any pain, either ocular or periorbital.

On inspection, a swelling of the conjunctiva like an enormous chemosis was seen filling the palpebral opening. The lower lid seemed somewhat distended and slightly everted, as in ectropion. The swelling was of a pale rose color, almost white, with a gelatinous and pearly appearance. Its surface was traversed by large and tortuous blood vessels, which disappeared in the pale and anæmic fundus of the mucous membrane.

On everting the lids, it was found that the swelling exactly filled the lower cul-de-sac. At the internal angle, where the cul-de-sac was almost effaced, the swelling commenced outside the caruncle, at the semi-lunar fold, of which there was no trace. As this line of contact of the conjunctival cul-de-sac with the sclera was almost parallel to the corneal circumference, and as the conjunctival swelling extended to the corneal margin, it is easily seen that this swelling surrounded a large portion of the cornea. The swelling was almost perpendicular to the scleral surface, and attained the maximum elevation at the middle of the space included between the lower cul-de-sac and the corresponding corneal margin. The form of the entire swelling was that of a crescent with the concavity turned upward; it surrounded the two lower and internal thirds of the cornea.

All that portion of the cornea from below upward which was surrounded by the conjunctival swelling was the seat of a large cicatrice; in its upper external third only, a small portion of tissue about 3 millimetres in size, situated along the peripheral margin, still preserved a certain transparency which revealed a segment of atrophic iris, adherent to the extensive and flattened corneal cicatrix.

On lateral illumination, nothing worthy of mention was noticed, but the transparency of the conjunctival swelling suggested a serous exudation.

There was no question here of an inflammatory chemosis from the absence of any active process of infection.

The excellent health of the patient and the limitation to a clearly defined zone of the bulbar conjunctiva gave no foundation for a diagnosis of a spontaneous œdema of the conjunctiva, such as is sometimes seen in persons who are weak or anæmic, or after certain important physical states (cardiac or renal affections, or repeated pregnancy).

The former injury might have led to the diagnosis of a cyst of traumatic origin, provided that it was not a question of a simple serous cyst.

On the subject of the differential diagnosis of simple conjunctival cysts, Saemisch (1) explains that in marginal fistulæ of the cornea which have a conjunctival covering a swelling of the mucous membrane may develop near the corneal margin, having a certain resemblance to a conjunctival cyst; however, the diagnosis is reached on considering their position and other alterations in the eye.

Wecker (2) in this connection says that "one should not confound this with blind fistulæ of the cornea, or with a cystoid cicatrization of a circumscribed wound of this region, which differs appreciably from cysts, which are very rare."

I was inclined to accept this interpretation, having confidence in these authors, and directed my treatment accordingly, convinced that it was only by a histological examination of a portion of the tissue forming the conjunctival swelling that the problem could be solved in a definite manner.

The following was the treatment pursued: The conjunctival swelling was perforated with a Pravaz syringe, and it was at once noticed that the needle encountered no resistance. On delicately withdrawing the piston, I succeeded in drawing off a half-syringe full of almost transparent fluid. The swelling then completely subsided. With a Græfe knife, I incised it through its entire thickness and extent in a direction parallel to the border of the lower lid, making the section fall in the middle of the space included between the lower fornix and the corresponding corneal margin; I then excised three portions, one parallel to the horizontal portion of the section, and two other smaller ones vertically at each side, which were at once prepared for histological examination.

I found immediately after cutting off these flaps that the cyst had absolutely no adhesions with the scleral tissue, the surface of which presented nothing which might explain a serous exudation

(1) *Handbuch der ges. Augenheilk.*, Vol. IV., No. 1, p. 149-50.

(2) *Traité compl. d'Ophtalm. de Wecker and Landolt*, Vol. I., p. 424.

from filtration of the endocular fluids. I carefully examined the point where the prolapse of the ciliary body existed, and which I have already mentioned in the objective examination of the patient. But here also there was nothing abnormal.

I immediately sutured the two conjunctival flaps, in order to cover again the denuded scleral surface.

After a few days, the child left the hospital completely recovered.

Microscopic examination of the fluid withdrawn from the cystic cavity.—The fluid withdrawn from the cystic cavity was put into a small tube and allowed to stand for twenty-four hours, after which a thick gray sediment was found at the bottom. The fluid, which at the time of extraction was of a slightly opaline color, was now perfectly transparent.

Microscopical examination of the sediment demonstrated that it was composed of leucocytes of various sizes and somewhat changed; some were swollen, hydropic, and almost disorganized; some were pigmented, with grains of black pigment in the protoplasm; endothelial cells were also seen like those in the walls of blood vessels and lymph spaces, some flattened and lamellar; there were also epithelial cells of rounded or of rectangular forms, with a distinct nucleus and a finely granular protoplasm; lastly, there was a protoplasmic residue resulting from the decomposition of white corpuscles in the fluid.

Anatomical examination of the excised tissue.—Anatomical examination showed that this was formed by the conjunctival mucous membrane with the characteristics pertaining to that which covers the eyeball. In the epithelial layers were found a number of cells with changes due to degeneration of the mucous membrane.

The connective tissue situated underneath, and which forms the proper tissue of the mucous membrane in its most superficial part, scarcely differed from the normal structure. It simply appeared to be hypertrophied, and was somewhat thicker than usual. In connection with this condition of hypertrophy the calibre of the blood vessels was larger than in the normal condition.

In the network of which this connective tissue is composed there was seen an infiltration of lymphatic elements, but it is known that this infiltration has been described as constant and normal by many histologists. I have never, however, seen typical lymphatic follicles. It was only in the deeper portions that the supporting connective tissue of the mucous membrane assumed a peculiar form—that is, it was

more crowded together and less infiltrated with lymph corpuscles. The fibres, which were more regularly arranged, united in bundles, and more frequently placed longitudinally, were arranged in layers in uniform manner, precisely as is seen in conjunctival formations, which compose the supporting stroma of the epithelial covering of cysts. The most characteristic fact revealed by the histological examination in relation to the clinical diagnosis was that this conjunctival zone, having the form of a small band, was continued in an epithelium, formed of a small number of layers composed of very much compressed cellular elements. In some parts of the section the epithelium was formed of two layers of cells; in other parts, however, perhaps from the obliquity of the section, three or four layers were seen. The deepest layer, which was contiguous to the connective tissue, was always formed of cubical cells with a large, well-defined nucleus; the more superficial, on the other hand, were composed of larger cells, more flattened, almost lamellar, but always having an easily recognizable nucleus.

The histological examination, therefore, proves that this was only a simple or serous cyst of the conjunctiva. I did not remove fragments from both walls, but only a portion of the superficial wall corresponding to the surface of the conjunctival mucous membrane, in the stroma of which the cyst had evidently developed, and the deep wall, in contact with the sclera, was left in its place, whence it disappeared, probably from the manoeuvres performed during the excision.

As for the pathogenesis of this serous or simple cyst of the conjunctiva, it seems to me that there is no connection between the former traumatism of the eyeball and the cystic formation.

Indeed, Uthoff (1) concludes from the study of the cases which he examined, in which this connection was evident, and to which I have referred, that the commencement of the development of the cyst should take place within a short time after the traumatism. But, in my case, three years had passed since traumatism before the patient noticed this new change in the eye.

(1) UTHOFF. (*Loc. cit.*)

Neither the clinical examination nor the anatomical study of the specimen revealed any of the signs which Uthoff describes as characteristic of cysts of traumatic origin. Indeed, the cyst had formed no adhesions with the sclera, and neither eyelashes nor other foreign bodies were found in its walls, so that no traumatic origin could be traced.

The existence of the large cicatrix in the cornea and sclera, with prolapse of the ciliary body into this, might have suggested the idea that, instead of the cyst, this was a sub-conjunctival serous infiltration, following alterations in the cicatrix. But, as I had rejected this idea for reasons given above, could I then admit a direct connection between the traumatism and the formation of the cyst? And in which of the varieties above enumerated should it be classed?

The patient stated that the first manifestations of the cyst appeared at that portion of the eyeball which was formerly injured, and that it was only later that this formation extended around the cornea. I am inclined to think that the patient was mistaken in these observations, for objective examination demonstrated that the conjunctival swelling exactly filled the lower cul-de-sac, and extended to the corresponding corneal margin.

It then seems evident that the origin of the cystic formation was in the lower cul-de-sac, and that by extension the cyst caused the swelling of the bulbar conjunctiva about the lower half of the eyeball. I should then conclude that the pathogenesis of the cyst was related to a cystic degeneration in a small excretory canal, or in a cluster of Krause's glands, which are known to exist also in the lower cul-de-sac. Indeed, the histological characteristics of the cyst wall strengthen this view, and especially the characteristics of the lining epithelium, which was composed of two or three layers of cells, and in some parts of a greater number, perhaps, on account of the obliquity of the section.

The lining epithelium, peculiar to cysts developed by dilatation of an excretory canal of Krause's glands, is, indeed, composed of two layers of cells; on the other hand, in cysts which

are developed by dilatation of one of the acini, the layer of lining epithelium is single; this disposition is in relation to that of the epithelium of the excretory canal and of the acini, which are in two layers in the first, and in a single layer in the second.

If, in my case, the number of epithelial layers of the cyst wall was three and four, it does not follow that the preceding opinion should be rejected, for independently of the obliquity of the section, it is known that the epithelium of glandular ducts frequently undergoes thickening about the orifice of the duct into the cul-de-sac, which increases the layers to three, and sometimes to four.

In opposition to the histogenesis which I have given, there is an objection, which is, that the cyst developed in the inferior cul-de-sac, instead of in the superior. Indeed, Antonelli (1) states that the relative frequency, not to say the exclusive possibility, of cysts in the superior fornix is justified by the fact that here Krause's glands are most numerous (8 to 20), and are frequently crowded in a space of a few millimetres, while in the lower fornix, they are very few in number (2 to 4), and are separated from each other. (CIACCIO: *Osservazioni intorno alla struttura della congiuntiva umana.*)

The same author states that the case of Bull (2) was the only observation of cystic dilatation of Krause's glands in the lower fornix, but says that this is not conclusive, as there was complete absence of anatomical research.

However, if the clinical history alone is considered, I think that the second case described by Bull in his work, which corresponds to that published by Faravelli and Rampoldi (3), should be referred to a cystic degeneration of Krause's glands.

In conclusion, I think I may say that the cyst which I examined was due to a dilatation of an excretory duct of one of Krause's glands. It is not possible to discover the precise cause which determined this dilatation.

(1) *Loc. cit.*

(2) *Loc. cit.*

(3) *Loc. cit.*

A differential diagnosis between a real cyst of the conjunctiva and a sub-conjunctival serous exudation formed by infiltration through a cicatricial cystoidal tissue situated near the corneal margin cannot be easily made from clinical facts, as Saemisch says (1). It can only be made after anatomical examination.

Cysts resulting from dilatation of the acino-tubular glands of Krause may develop in the lower fornix of the conjunctiva, and by spreading upward, they lodge in the sub-mucous connective tissue of the bulbar conjunctiva, which aids in the formation of the supporting stroma of the walls of the cyst. After the development of the cyst the swollen bulbar conjunctiva assumes a peculiar aspect by reason of the serous and transparent contents of the pocket, so that in some cases the cystic formation may be confounded with a simple conjunctival effusion produced by filtration of the intra-ocular fluids through a faulty cicatrix. As the conjunctiva enters into the formation of the cyst, the latter is not movable under the mucous membrane, and therefore the differential diagnosis is somewhat difficult.

(1) *Loc. cit.*

THE WORD "ASTIGMIA."—ASTIGMIA AFTER CATARACT OPERATION.

By Dr. **GEORGES MARTIN.**

The word *astigmia* is, in my opinion, preferable to *astigmatism*. It is shorter; this is an advantage which will be appreciated in a work of some length if the word occurs many times. But this is a secondary reason, although I have stated it first. If this were the only reason, it is probable that I should never have proposed this new word. The abbreviation *As.*, well known to the medical profession, suffices to economize the time of authors and the paper of editors. There are two other reasons of real value which have led me to substitute the word *astigmia* for *astigmatism*.

The latter word is derived from the Greek *ἀ*, privative, and *στίγμα*, a point. In forming it, the Rev. Dr. Whewel wished to recall the physical fact which determines this visual anomaly. When the rays emanating from a luminous *point* penetrate an eye whose cornea or lens has a greater refraction in one direction than in the perpendicular direction, they do not form an image of a *point* on the retina, but figures in the form of lines, ovals, or rounded spots are obtained.

But our English colleague, in choosing the substantive to enter into the composition of the word which he wished to form, committed an error: *στίγμα*, *αρος*, does not mean a point in the sense in question. By consulting Greek dictionaries of all periods, it will be found that it signifies *puncture*. This is the origin of the word *stigmata*, which is used, for example, in speaking of the wounds made in the hands and feet of Christ by the nails which held him to the cross. To designate a luminous point, one should have recourse to *στίγμή*, *ῆς*, which means the mathematical point. This word requires the termination *ia*, which is found in such words as *aphonia* (*ἀ*, *φωνή*, without voice).

Before launching this word in the scientific world, I desired the approval of competent Greek scholars. I therefore consulted various scientists, among them M. Ouvre, the erudite professor of the Bordeaux Faculty of Letters, and M. Monnier, one of the most distinguished members of our law faculty, devoted for a long time to the special study of ancient languages. They all found this new-born word without original taint and well fitted to live. With such protectors, the fortune of the word is well assured.

This second important motive in favor of the substitution which I propose is this: Various words serving to designate either instruments for measuring asymmetry of refraction or conditions related to this anomaly are really derived from *στίγμα*, and not from *στίγμα*. With the latter word, the instruments would not be spoken of as *astigmometers*, but *astigmatometers*. But the first of these two words is the only one used. The expression *astigmogenic contraction* has been used for a long time to designate the partial contraction of the ciliary muscle which produces an asymmetry of refraction. This expression has been in use by many of my colleagues. But the word *astigmatogenesis* is also derived from *στίγμα*.

Variations in the Degree of Astigmatia after Cataract Operation.

It has been long known that the astigmatia which follows cataract extraction requires a certain time, ordinarily three months, to disappear. When this period of time has elapsed the astigmatic degree found has been supposed to be definite. Hence the rule of conduct which operators enforce in their practice: to order temporary glasses immediately after recovery from the operation, and to replace them after the fourth month by glasses better suited to the condition of the refraction.

Various facts have led me to conclude that it is at times necessary to change even these latter glasses. As I stated in a small volume of the Charcot-Debove library, with the title *Myopia, Hyperopia, and Astigmatia*, "I have noticed quite curious

changes in three patients operated upon for cataract. One of them presented for three years an astigmatism of 3.25 dioptries. What was my surprise, one day, to find, without any other concomitant phenomenon than a recent reduction of vision, a diminution of 1.75 dioptries in the amount of astigmatism, the proper correction of which re-established the former vision."

In a fourth case, after having witnessed first an increase in the amount of astigmatism, I have then observed a progressive diminution of the amount. This case, I think, merits publication.

M. X—, seventy-five years old, was operated upon by me for cataract in the right eye on May 13, 1892. The operation was performed by extraction by a small flap combined with iridectomy. During the first five days all went well, so that the patient obtained permission to rest several hours in a chair. On the sixth day, during the absence of the attendant, the patient concluded to wash his face with cold water. A few hours after this imprudence the eye became inflamed. In the evening, I found it red, painful, lachrymating, and the anterior chamber filled with blood. After this accident, recovery was retarded and vision was inferior to what it should have been. The blood which escapes into the eye had induced an inflammation of the lens capsule, and a secondary cataract followed. Vision on the 10th of June was only $\frac{1}{2}$. The degree of corneal astigmatism was high, a fact which is always observed when the wound does not close by first intention.

I give the figures which were found at the various astigmometric examinations made in the six months following the operation :

June 10.....	6 dioptries.
June 28.....	4 "
July 23.	3 "
July 27.....	2.50 "
September 7.	2.50 "
October 6.....	2.50 "

It will be seen that at the end of July—that is, about two months and a half after the operation—a definite degree of corneal astigmatism seemed to be established.

On the 15th of October I operated for the secondary cataract with Knapp's capsulotome. The operation was made under cocaine, and produced no pain. It was followed by no inflammatory irritation.

On November 3, examination showed that vision was almost normal.

On the same day, I found an increase in the degree of corneal astigmatism. I give a table of the figures found up to the month of June, 1894 :

November 3, 1892.....	3.50	dioptries.
November 14.....	3.25	"
November 23.....	3.00	"
December 8.....	3.00	"
February 7, 1893.....	2.75	"
April 5.....	2.25	"
June.....	1.50	"
June, 1894.....	1.50	"

The slight operation performed by puncture of the cornea, and not by incision, without the slightest interference with the iris, had caused an increase in the astigmatism. On November 3—that is, eighteen days after the capsulotomy—I noticed an increase of one dioptry. It is probable that if an examination had been made a few days after the capsulotomy I should have found even a higher degree. I am led to think this from the fact that during the three weeks which followed this examination there was a clearly marked progressive diminution of a half dioptry.

To reach a degree in the neighborhood of that which existed before the capsulotomy, nearly six months were required. On April 5, 1893, the astigmatism was no more than 2.25 dioptries. The reduction, however, had not reached its limit, for in June, 1893, the astigmatism was 1.50 dioptry. From that time, there was no further change. In fact, the actual definite astigmatism was not established in this patient until one year after the extraction of the cataract.

A CASE OF CARCINOMA OF THE CONJUNCTIVAL LIMBUS IN A CHILD OF FOURTEEN YEARS

By Dr. **ROGMAN**,

Physician-in-Chief to the Ophthalmic Institute of Ghent.

Case.—On December 27, 1893, L. M——, fourteen years of age, a native of T——, came to my clinic. On the corneo-conjunctival limbus of the right eye, in the lower internal region, was a small tumor which from its persistence had attracted the attention of the family physician, my distinguished colleague, Dr. St. Nicholas De Ryck. The tumor was of a yellowish-white color, 3 millimetres wide, 4 millimetres long, its greatest diameter being parallel to the limbus, and it was raised about 1 or 2 millimetres above the sclera. Its surface was slightly nodulated, but not ulcerated. It did not encroach upon the cornea, and was not movable when the conjunctiva was moved over the sclera. On its peripheral side it was surrounded by a slight superficial vascularization, which by its color contrast emphasized the pale yellowish tint. The tumor had been noticed for the first time one month and a half before this visit; the family, however, remembered that, for two years before, the eye became easily reddened by the wind or any other irritating cause. There was not and never had been pain in or about the organ; only for the last fifteen days the child had noticed, from time to time, a sensation like the prick of a pin. All the other portions of the eye were normal, and the function was regular. No ganglionic enlargements were found. There had never been an injury or any other noticeable cause which could have given rise to the disturbance. The child was in perfect health; he was the youngest of five children, the eldest of whom was twenty-six years old, all of whom enjoyed the best of health. The parents are still living, and have never had any disease. There was no antecedent history of tumors in the family.

The tumor was removed with a bistoury, the blade gliding along the sclera, and then the surface of implantation was energetically curetted.

The after treatment was very simple, and no complication occurred. The wound recovered without leaving any other traces than a slight spot of venous tint (thinning of the sclera from the grattage), which still persists.

Anatomical Examination.—The tumor was hardened in the chromo-osmic fluid of Flemming and imbedded in celloidin.

It was cut parallel to the surface. The sections, about forty in number and taken at different depths, were colored with safranin, and were divided into three series—superficial, median, and deep. The tumor had somewhat the form of a truncated cone flattened at the side, and by comparing the sizes of the sections it was easily seen what relative positions they had occupied.

The structural arrangement was the same in all of them: at the periphery, in almost the entire circumference, was a border formed of conjunctival epithelium; in the centre, the body of the tumor.

The conjunctival border was much wider at the two angular extremities of the section than at the sides, probably because the razor had encountered the conjunctiva in a direction more inclined to its surface. It was formed of pavement epithelial cells progressively smaller, more flattened, and serrated near the periphery, more globular, and less exactly united in the deeper part. In some places the intercellular spaces were quite large; they formed actual vacuoles, where here and there were seen immigrated white corpuscles, assuming various forms and with filaments stretching from cell to cell; these filaments were very well marked in places: they formed what are known as intercellular bridges.

In half of the sections the epithelial layer was quite sharply limited from the subjacent tissue, but in the second half, it was prolonged in tracts into the tumor proper. These tracts were continuous there with cellular groups surrounded by bundles of connective tissue; the cells forming these groups had almost all preserved their more or less globular form, while some were slightly compressed; their nucleus was sometimes small, sometimes deeply stained, rounded or oval, and ordinarily quite regular. Intercellular bridges were here found.

In the second half of the sections the cellular groups had a different appearance: crowded together in the midst of an abundant connective tissue, the cells which composed them were pressed concentrically together; they were flattened, horny, and covered each other like the layers of an onion, and at the centre they completely lost their form and were replaced by an amorphous substance strongly colored by the safranin. In some places these horny cells were found not only near the amorphous central substance, but also at the periphery, the two layers being then separated by cells which had preserved to a greater or less degree their form with

protoplasm and nucleus. The external horny layer sometimes surrounded two contiguous centres of degeneration (1). The epidermic globes thus formed were about twenty in number; they were situated, as I have said, for the most part in the sub-epithelial cellular tissue, but some were also found in the epithelial covering and in the complex tissue of the first half of the tumor described above.

The superficial layers were distinguished by the relative predominance of epidermic tissue. In the deeper layers the conjunctival tissue became more and more predominant. The portion of the sections which corresponded to the first half of the proper tissue of the tumor was formed of a reticular tissue in the meshes of which were found numerous white corpuscles. The epidermic globes penetrated to the deeper layers. Numerous newly formed blood vessels were found in all parts.

The anatomical diagnosis was then unquestionable. This was a commencing epithelial carcinoma of the conjunctival limbus.

Malignant tumors in the ocular conjunctiva, as well as in all other parts of the body, are proper to old age, and it is rare to see them appear before the age of forty (Panas). In studying the literature on this subject, I have only been able to find seven cases in younger patients: one case of Dujardin (a child of twenty months); two others of Panas (twelve, and thirteen and a half years); another of Keyser, in a young man nineteen years of age; that of Lagrange (*Transactions of the French Ophthalmological Society*, 1892, p. 81), occurring in a man twenty-seven years old, (epithelioma situated between the caruncle and the limbus); still another of Valude (*Ophthalmological Society of Paris*, December 1, 1891), in a man thirty-five to forty years of age (epithelioma of the limbus); lastly, the case of a man thirty-seven years old presented by Bousquet to the Anatomical Society of Paris, November 3, 1876 (encephaloid carcinoma).

The cases of Dujardin, of Panas, and of Keyser, from the ages of the persons in which they occurred, are the only ones which bear a relation to my case.

(1) This disposition seems to me to constitute an argument in favor of the theory of Sgrosso concerning the genesis of the epithelial globes.

That of Keyser was published in *Zehender's Monatsblätter*, 1869 (Operative Beseitigung einer Cancroïdgeschwulst von der Augapfeloberfläche). The author gives no details of the result of histological examination, but merely states that the tumor was of cancroïdal structure. A small cancerous tumor had previously been removed from the nose.

The case of Professor Dujardin was reported in the *Journal des Sciences Medicales de Lille*, 1885, p. 747, under the title of Sub-conjunctival Tumor of Epithelial Nature. A small tumor was found in the left eye of the child under the bulbar conjunctiva, perfectly movable, situated a short distance from the caruncle, and partly hidden by the lower lid, of a whitish color and the size of a small bean. The parents had only noticed the existence of this tumor for a few weeks. The child was in very good health. After excision, which was followed by a prompt recovery, a histological examination of the tumor was made by Professor Augier.

This tumor, writes the latter, was of the form and size of a rather small pea, and of quite firm consistency; on section, the tissue was grayish and of uniform appearance. The tissue was easily teased apart with needles; microscopical examination of one of the small teased fragments showed that it was completely formed of a collection of epithelial cells analogous to the cells of the epidermis. These cellular elements were completely reduced to the condition of horny epidermic layers: the small thin plate which formed the cell was wrinkled, and the folds which gave it this appearance started from the centre, where the nucleus was represented by a clear space. There was no trace of living protoplasm in these living epithelial cells, as no reagent, neither aniline, carmine, nor osmic acid revealed it. This mass of epidermic layers was contained in a thin fibrinous capsule. Lastly, I must mention the total absence of capillary vessels in this neoplasm of such peculiar nature, remarkable on account of the age of the patient, its position, and its constituent elements.

The two cases of Professor Panas were published in his *Traité des maladies des yeux*, 1894, Vol. II, p. 295. In one, melanotic

epithelioma of the limbus occurred in a child thirteen and a half years old. It was movable on the subjacent parts. The tumor had been noted in the form of a small black spot the size of the head of a pin at the age of one year. After the fifth year, it had increased progressively in volume until at the time of the operation it was the size of a bean. Histological examination revealed epidermic globes. In the second case, the child, twelve years of age, had in the upper external portion of the limbus a congenital nævus, noticed in early childhood, and which had later undergone malignant transformation with spreading character. The epithelial nature of the cell groups was diagnosed from their follicular disposition, the absence of vessels in their interior, and their transformation, in places, into mucous elements.

In fact, the only known cases of carcinoma of the limbus in early age are the first one of Panas and my own. The tumor described by Dujardin was not situated at the limbus. The second case of Panas, characterized by mucous degeneration, seems to approach that kind of neoplasm to which Parinaud (1) has given the name of dermo-epithelioma.

The nature of malignant tumors of the limbus has caused much controversy. Clinically, sarcoma is differentiated with difficulty from epithelioma. In an article which appeared in von Græfe's *Archives* (Zur Casuistik der an der Hornhautgrenze vorkommenden Carcinome und Sarkome) (2), Berthold gives the following differential diagnosis between these two tumors: 1st, in carcinoma the adhesion of the neoplasm to the cornea is more intimate on account of the greater thickness of the epithelial layer in the latter; 2d, the borders of the sarcoma are raised perpendicularly from the cornea and the sclera, those of carcinoma are inclined; 3d, the tissue of carcinoma is very delicate and fragile, that of sarcoma is of a firmer consistency. The literature of the subject shows, however, observes Heyder (3), that these characters are far from being constant. In my

(1) *Arch. d'Ophth.*, 1884, p. 349.

(2) *Arch. f. Ophth.*, Vol. XIV., 3, p. 149.

(3) *Arch. f. Augenh.*, Vol. XVII., p. 413.

case there was concordance with the second symptom, but not with the third, as the tumor was dense and hard.

According to Panas (1), the structure of tumors of the limbus is more frequently mixed. "My personal researches," he says, "corroborated by published facts, have led me to the conclusion that in the majority of cases the neoplasm is epitheliomatous, with the addition of sarcomatous elements, especially abundant in epibulbar tumors of rapid progress and large size." If it is not always easy, histologically, to determine the exact character of each of the elements which compose these tumors, the anatomical diagnosis of the preparations may be established with certainty from a single valuable sign, which is rarely used in researches of this kind, although it is most frequently perfectly practical, especially after hardening in Flemming's solution, as has been pointed out by Dr. Vanderstricht, the obliging and learned chief of the University: I refer to the intercellular bridges. This sign shows that the degeneration is uniform; in places, indeed, where the epithelial type of the cells is less distinct the intercellular bridges remove all doubt.

It is proper to say on this subject that in my own sections the fibrillar radiations which surrounded certain elements gave them this peculiar appearance, which has caused them to be considered by several pathologists as parasitic elements. By comparing these elements with each other in different portions of the tumor, I am convinced that they are simply cells more or less modified by intercellular bridges, as has been stated by Ribbert (2).

In affections of the conjunctival limbus, the diagnosis which it is important to determine immediately is between malignant tumors, on the one hand, and benign tumors and inflammatory processes, on the other hand. When these disturbances are just commencing, there may be considerable difficulty in distinguishing them. Malign tumors may be mistaken for a papilloma, a pinguécule, a dermoid, and, above all, they are easily con-

(1) PANAS: *Traité des maladies des yeux*, Vol. II., p. 285.

(2) *Centralbl. f. Allg. Path. und Path. Anat.*, V., p. 111.

founded with phlyctenular disturbances, especially when their principal differential symptom, that of age (1), is lacking. My case, however, proved, and this circumstance gives it a peculiar interest, that the presumptive diagnosis based on the persistence and the continued development of the process should suffice in cases of this kind to authorize and even to impose intervention. Indeed, the preservation of the eye may depend upon prompt and energetic action.

The treatment of malignant tumors of the limbus has been the subject of numerous discussions in recent years. While some ophthalmologists advise immediate enucleation of the eye as soon as the neoplasm has been recognized, others are content with a local treatment, and do not concede the necessity of enucleation until the tumor has reached a certain size (Caspar) (2). Still others (Valude) (3) claim that epitheliomas of the sclero-corneal limbus, which, in general, have no tendency to extend either upon the cornea or the sclera, present rather the indications for local extirpation.

In support of his view Valude gives two examples which demonstrate how long a time the eyeball can resist the invasion of malignant tumors which develop on its surface. I have had a similar case. Every New Year I receive a visit out of gratitude from an old gentleman, J. van L., of L——, seventy-six years of age, from whom I removed, six years ago, with preservation of the eye, a cancer of the limbus of several years' duration, extending from the lower third of the cornea to the caruncle, and which had previously been treated by other oculists. I have been assured by these visits that up to this year there has been no recurrence, and that he retains his good health.

The case which forms the subject of this article is a new proof of the efficacy of local treatment, for, since the operation was performed, more than a year has elapsed, the period of

(1) DE WECKER : *Traité complet d'ophtalmologie*, Vol. I., p. 437.

(2) *Archiv. f. Aug.*, XXIV., 180.

(3) Soc. d'Opht. de Paris, Session of December 1, 1892.

probation which Lagrange considers necessary (1), and from advices which I receive from my colleague, Dr. De Ryck, no tendency to recurrence has yet manifested itself.

When examination shows that the media of the eye are still completely exempt it is nearly always proper to try local extirpation, even when, according to Professor Knies (2), there has already been a recurrence, as in one of my cases. But care should be taken to remove the tumor as completely as possible by finishing the operation with the galvanic or thermo-cautery, or rather with energetic curetting of the surface of implantation. Knies and Sgrosso (3) draw over the neighboring conjunctiva and fix it to the operative wound. Although this practice is formally condemned by Lagrange (4), I think that one should be guided according to the supposed nature, progress, and extent of the affection, and that it is not necessary to systematically renounce the advantages of a covering, at least partial, of the wound, which the superimposed conjunctiva, on account of its slight thickness, does not completely hide from view.

Enucleation of the eye should not be performed, especially in the early stage, until perforation or extended invasion of the enveloping membranes of the eye does not allow of simple ablation under favorable conditions, but demands complete removal of the neoplasm.

(1) LAGRANGE : Transactions of the French Ophthalmological Society, 1892, p. 95.

(2) KNIES : *Grundriss der Augenheilkunde*, 1888, p. 136.

(3) KNIES and SGROSSO. (*Loc. cit.*)

(4) LAGRANGE. (*Loc. cit.*, p. 92.)

CLINICAL NOTES

SUB-CONJUNCTIVAL OSTEOMA

By Dr. **GALTIER** (of Nîmes).

Occurrences of this nature are very rare. No mention is made of them in the best known works upon the pathology of the eye, and it is only in the extensive treatise by de Wecker and Landolt that we find a short chapter upon this subject. Three cases are therein noted, and are as follows :

1st. A case of von Græfe.

This is that of a young girl who had long noticed a slight swelling of the upper lid (of which eye is not stated) and a sense of discomfort consequent upon the feeling of weight. Upon eversion of the lid a tumor about half the size of a walnut was found near the external commissure; it was oval in form, as hard as cartilage, had a neck-like prolongation, and was situated beneath the conjunctiva, which was quite normal in appearance. When removed, this hard portion was found to be formed of a much-thickened cellular tissue, and to enclose true bone tissue, and in its structure resembled an incisor tooth 3 millimetres in length.

2d. Saemisch's case.

This was a young man who had for some time been aware of a slight swelling under the upper lid of the right eye, which for several months had given a sense of discomfort. Under the bulbar conjunctiva between the external and superior recti was found a proci-dentia which extended to the cul-de-sac and was the size of a bean. This tumor was only slightly movable, was very resistant, and by its surface adhered extensively to the conjunctiva.

When the tumor was enucleated it was found to be extremely resistant, so much so that it was not possible to grasp it with the teeth of the forceps. Its upper surface was convex, and the lower concave surface rested upon the sclerotic. The two surfaces were merged in rounded borders. The length of this ovular tumor was 9 millimetres, and its thickness 3 millimetres; it was composed mainly of bony tissue with a dense covering of cellular tissue.

3. A third case was noted in 1871 in de Wecker's clinic.

It was that of a young woman of twenty-six years, who, under the conjunctiva of the superior cul-de-sac of the right eye, had a very resistant tumor, which I can compare only to a slightly flattened date-stone. This tumor, which was $\frac{3}{4}$ of an inch in length, was not absolutely adherent to the eyeball, but was only slightly movable, because the conjunctiva had become fixed upon the middle portion of its anterior surface. It had developed very slowly, and caused but a slight projection beneath the upper lid, and a sensation of heaviness when the lids were separated. Its removal was easily accomplished, a strip of the conjunctival tissue being left adherent to the tumor. Microscopic examination showed that this mass, with its rounded anterior and flattened posterior surface, was composed of very dense cellular tissue, enclosing a perfectly organized osseous centre without any cartilage.

In my own practice the following case occurred about six years ago: A young girl from Beaucaire, ten years of age, large and robust, and apparently in perfect health, was brought to me on account of a peculiarity of the right eye of which she herself was quite unconscious. The upper part of the eye had become slightly injected, and her governess advised her to see a physician. The child felt no discomfort, and, had attention not been called to it, would not have mentioned the eye at all. When she turned the eye downward and inward a well-defined projection of the form and size of a slightly flattened pea was found at the equator of the eye, above the horizontal meridian and behind the equator. The corresponding portion of the raised bulbar conjunctiva was congested. This projection, which was somewhat resistant, was slightly movable upon the eye, but to a very limited extent, and it was evident that it adhered firmly to the conjunctiva which covered it.

As the tumor was somewhat large, and as its base was not united to the eyeball, I proposed its removal, and began by slowly making an incision in its long diameter, then endeavoring to separate it from the adjacent parts. It was, however, so firmly adherent that this proved too difficult of accomplish-

ment. I then seized the mass with a toothed forceps, and, lifting it as far as possible, excised it by snipping with the scissors, and thus removed it from its cellulo-mucous envelope. What was my surprise, upon dissecting it, to find its contents hard, absolutely osseous, and formed of very compact tissue. The bone had the general appearance of an oyster-shell, with a smooth and polished concave surface, which was applied to the eyeball, and an upper rough and knobbed convex surface which was very adherent to the bulbar conjunctiva. Its length was 1 centimetre; its breadth, 7 millimetres. I sent the specimen to the histological laboratory at Montpellier, hoping that the microscope would throw some light upon its nature. Was it a neoplasm or a portion of normal bone accidentally detached from one of the orbital walls? The reply which was given me was simply this, "This bony tumor appears to be composed of normal osseous tissue."

The question had the more naturally arisen in my mind because of a special feature of much importance in the child's history.

About six or seven months previously, toward evening, several boys gave chase to her, while others suddenly held a rope before her, so that she fell with violence upon her forehead, and so quickly that she was not able to protect her face by spreading her hands in front of her. She recalled the fact that it was the right side of her face and forehead, consequently the upper orbital border, which came in contact with the ground. The fall nearly stunned her, but by the next day she scarcely felt any effects from it, and was soon cured. Nothing at that time pointed to injury of the eye.

The results of the histological examination, which indicated that the bony tissue was absolutely normal, and the history of the recent accident, incline me to the belief that the bony tumor was accidental, and was composed of a fragment of bone detached from the orbital vault by a splintering following the blow upon the border of the orbit, the fragment becoming imbedded in the conjunctival tissue, and that it was not a tumor spontaneously formed in that situation.

The fact that six years have elapsed since the operation, and that there has been no return of the tumor, likewise militates against the idea of a neoplasm.

Still, my case is very similar to those already given in the history of sub-conjunctival osteoma, especially to that of Saemisch, which is, in fact, almost identical with it.

We must take into account that the reports of known cases are relatively brief, and that it is not shown that any inquiry was made as to possible previous traumatism. Moreover, these four cases all relate to young patients, and youth is not the time of life favorable to the growth of neoplasms. I would also call attention to the fact that in the three first cases, as well as in my own, the bony tumor was situated in the upper conjunctiva; this gives additional weight to the theory of traumatic origin, for when there is a violent fall upon or a contusion of the face the upper orbital border is the one to receive the blow, the lower border escaping direct traumatism by reason of the protection afforded by the projection of the malar bone.

I even question whether the subject of sub-conjunctival osteoma is a legitimate one, and whether the cases quoted would not better be included under the head of fractures of the orbital vault, with an encysted movable fragment of bone; this classification would slightly alter the prognosis, although it is true that these tumors are, up to the present time, classed with benign tumors of the conjunctiva.

SUTURE OF THE CORNEA FOR EVERSION OF THE CORNEAL FLAP AFTER OPERATION FOR CATARACT

By Dr. **A. TROUSSEAU.**

At the meeting of the Ophthalmological Society of Paris, held April 3, 1894, I reported a case which demonstrated the

great utility of a sclero-corneal suture in the reduction of a hernia of the vitreous body which occurred after simple extraction of the crystalline lens in cataract. Thanks to this suture, I was able to save an eye which I had looked upon as lost.

By means of this same process I obtained an excellent result by causing complete coaptation of a corneal flap which had become everted after operation for cataract, a coaptation which was followed by perfect cicatrization, with preservation of the transparency of the cornea and good visual power.

A woman of sixty-eight years had been operated upon for cataract without the occurrence of any noteworthy incident; the wound was in good coaptation, the iris was in place, the pupil was round, and all seemed to point to a normal recovery, when, on the third day, upon removal of the first dressing, I perceived that the upper corneal flap was completely everted, leaving the iris and a portion of the still round pupil uncovered. Singularly enough, the iris was not displaced, and the vitreous body did not seem to have escaped. Repair of the injury was therefore possible if only the everted flap could be replaced. I attempted several times to replace the flap by means of a spatula, and to keep it in place by simple palpebral pressure, but in vain. The flap, which was replaced with some difficulty, always fell back again as soon as the eyelids were closed. In the face of such contumacy I did not hesitate to suture the upper border of the flap to a small portion of the cornea extending along the sclerotic above (the section had not been strictly peripheric). After vigorous antisepsis I took a needle threaded with catgut 00, and passed it from without inward in the upper part of the flap, then from within outward in the strip of cornea. I gently tightened the thread without losing a single drop of the vitreous body, and obtained an excellent coaptation.

Four days after this operation the wound was cicatrized and the anterior chamber perfectly reformed. The cornea was exceedingly transparent except at the point of entrance of the thread, where it was slightly opaque. There was no reaction. In brief, the patient was able to go out twelve days after the

second intervention, the thread being still in place, and with a good eye.

Resorption of the thread was complete in about four weeks, and the vision of the patient, with a convex glass, + 10 D., is $\frac{1}{2}$. It would be better yet were there not some pupillary exudation and a small secondary mass adhering to the border of the iris. During the discussion following my communication in March, 1894, at the Ophthalmological Society, Dr. Chevallereau reported a case in which he performed sclero-corneal suture for the eversion of a flap, but in this case vision was not preserved.

I believe that suture of the cornea may be of the greatest use in the treatment of a certain number of complications following extraction of a cataract, as is proved by Galezowski's cases, and by those to which I have called attention.

INSTRUMENTS

SOME INSTRUMENTS

By Dr. NICATI.

Fine-toothed Forceps for Iridectomy.—These forceps, which are very light, may remain attached to the iris without causing injurious traction, a quality which will be appreciated by all who are not ambidextrous. It possesses the advantage over Dr. Vacher's forceps of seizing the iris merely by the equal pressure of the handles, which are fixed by a spring. Such pressure is better tolerated than the slightly intermittent pressure of the hand, and the operation is rendered less painful.

Eyelid Speculum without a Catch.—All kinds of catches are troublesome in blepharostats, because their manipulation increases the length of time necessary in the separation of the lids. A good blepharostat is one whose force of expansion is equal to the force of closing of the lids, and has therefore no need of any mechanism for fastening it. The one which I use is the hooked blepharostat of Landolt thus modified.

Palpebral Elevator for Cataract Operation.—This elevator, which is easier of application than the finger of an assistant, and as easily removed by the slightest touch, possesses the further advantage of a more perfect antisepsis. It is composed of one loop of wire soldered in the middle, with its extremities suitably separated and simply bent at a right angle; these extremities, not being curved upon themselves, like the hooks of a blepharostat, are not held by closure of the lids.

Cataract Knife.—This is a triangular and very narrow knife which cuts better than Græfe's knife, and possesses all the advantages of the latter, including that of permitting section of the iris.

Linear Knife.—Very narrow, and useful either as needle or knife, it is not only serviceable in discission and iridectomy (see December number of *Annales*), but may also be used for punctures of whatever kind, including opening of the cornea in iridectomy. No anterior chamber is too narrow to admit of its entrance, and there are no possible circumstances in which the lamellar knife should be given the preference.

II.—REPORTS OF SOCIETIES

CONGRESSES

OPHTHALMOLOGICAL SOCIETY OF THE NETHERLANDS.

Fifth Semi-annual Session, held at Leyden, May 27, 1894.

Summary of the Proceedings, by Dr. SULZER.

DR. DOIJER (of Leyden), the annual president, opened the session with a biographical sketch of Børrhave. It may be of interest to relate here the chance which led this noted scientist to devote his life to the study of medicine.

Børrhave, the son of a Protestant minister, was destined to follow

the career of his father. His philosophical dissertation, which he defended in 1690, was a refutation of the philosophy of Epicurus, Spinoza, and Hobbes. It so happened that while making a journey by coach some of his travelling companions were ardent antagonists of the celebrated Amsterdam philosopher. The young theologian ventured to ask one of the assailants of Spinoza if he had read his works. He received no response, but this timid interference in the discussion gave him the reputation of being a follower of Spinoza, a circumstance sufficient at that time to cut short his theological career. Medicine thus gained one of its most celebrated representatives, who was obliged for a number of years to earn his living by giving lessons in mathematics.

A Rare Ophthalmoscopic Image.

DR. WESTHOFF (Amsterdam).—(See *Annales d'Oculistique*, Vol. CXII., p. 351.)

Treatment of Infantile Glaucoma Producing Buphthalmos.

DR. SNELLEN, Jr. (Utrecht).—I have been able to obtain a diminution of the buphthalmos and to arrest the development of this disease in three cases which have come under my observation within a few years by the following operative procedure: every three days I puncture the anterior chamber at the limbus, the punctures being made side by side. The operative treatment is assisted by the energetic use of myotics. This treatment is in accord with the pathological anatomy of buphthalmos, which shows that in this disease the spaces of Fontana are but slightly developed. It causes a distention of Descemet's membrane, which favors reabsorption of the over-secreted aqueous humor.

Descemetitis.

DR. SNELLEN, Jr. (Utrecht).—See *Annales d'Oculistique*, Vol. CXIII., p. 145.)

Operative Treatment of Trachomatous Keratitis.

DR. MULDER (Groningue).—For more than twelve years, in cases of trachomatous keratitis, I have excised the portion of the fibres of the orbicular muscle which are situated on the tarsus. This sphincterectomy is performed with the aim of diminishing the pressure exerted by the upper lid on the cornea from the

more or less pronounced tonic contraction of the orbicularis, and at the same time of obviating the ptosis which is always met with in a certain degree in trachoma. Corneal disturbances in trachoma are always limited to the portions of the cornea covered by the upper lid, and raising the latter, as well as diminishing the pressure which it exerts, have an important influence on the development of the corneal affections. In adults, the operation may be performed without the use of cocaine. After applying Snellen's forceps, all the muscular fibres on the tarsus, together with an elliptical flap of mucous membrane, are excised. The wound is closed with several sutures.

This procedure hastens the recovery of existing keratitis, and prevents its occurrence in the majority of cases of trachoma, on which it has a beneficial effect. It prevents the formation of entropion. In cases which require blepharoplasty the two operations may be combined.

This operation may also be recommended in non-trachomatous keratitis accompanied with blepharospasm, and especially in recurring phlyctenular keratitis.

Removal of the Lens in High Degrees of Myopia.

DR. VRIJBURG.—(A general review of recent literature.)

Treatment of Detachment of the Retina.

DR. STRAUB (Amsterdam).—Encouraged by the discussion at our last session, I adopted the operative treatment of detachment of the retina. During the five months since the operation the retina has remained attached. The method employed was the following: An incision through the sclera was made at the point of detachment, and the conjunctiva was then united to cover the scleral incision, and several drops of a solution of sublimate, 1 to 5,000, was injected through the incision in the conjunctiva which laid bare the sclera. This injection was repeated three days after the operation. When the bandage was removed, a week later, the retina was found in place. The patient was sixteen years old, and had a myopia of 16 D. The right eye was blind from an old retinal detachment. The detachment in the left eye was noticed for the first time on May 5, 1893. It was of variable extent, and disappeared completely at two periods, in June and August of the same year.

The operation was performed on January 2, 1894, and as a result the visual field is almost completely re-established.

A Case of Hysterical Amblyopia with Central Scotoma.

DR. BLOCK (Rotterdam).—Miss J. L.—, twenty-five years of age, suffered a marked diminution of vision in the right eye following an operative opening of the right mastoid apophysis made necessary by an operation for a cholesteatoma of the auditory canal, which had penetrated into this cavity. The vision of the left eye was also disturbed.

Five weeks after the operation vision in the right eye was $\frac{1}{4}$, and in the left, $\frac{1}{2}$. The eyes were found to be normal. There was considerable concentric narrowing of the visual field on both sides, and, in addition, in the right eye there was a central scotoma of variable limits. Continuing for some time the perimetric measurements, the exterior limits were found to become more narrow, and the scotoma to increase in extent. The patient had characteristic hysterical stigmata.

Sixth Semi-annual Session, held at Utrecht, December 16, 1894.

The honorary president, Prof. Snellen (Utrecht), introduced the members of the society to the new ophthalmic hospital of Utrecht, an institution perfectly equipped in all respects. The black walls of the operating-room prevent reflections which might trouble the eyes of the patients. A committee on organization was appointed for the International Congress of Ophthalmology in 1899.

Exenteration of the Eyeball.

DR. MULDER.—I perform exenteration of the eyeball with a sharp enucleator, after removal of the cornea. This procedure was first suggested to me in 1883 after numerous experiments on rabbits, and the relation of this operation to enucleation was presented in a thesis by my pupil, Daubenton, which appeared in 1884. Since that time there has been a larger experience, and I am able to present the following conclusions :

1. The mobility of the prosthesis is greater after exenteration than after enucleation.
2. Exenteration is easier to perform than enucleation.
3. In panophthalmitis exenteration is less dangerous than enucleation.

This last point has been much discussed. The partisans of enucleation in panophthalmitis take the theoretical stand that meningitis depends on a phlegmon of the orbital tissue independent of any operation and justifies early enucleation of the eyeball. My personal

experiences, as well as an examination of the literature, shows the slight foundation for this theory. There is no case of meningitis consecutive to panophthalmitis occurring after exenteration of the eyeball known to us at present.

The method of operating is not without influence on the results of exenteration. Græfe and Bunge detach the conjunctiva from the eyeball and remove a ring of the sclera. They thus sacrifice a portion of the conjunctiva and unnecessarily open the capsule of Tenon. It is preferable to remove the cornea by making a flap section and excising the other portion of the limbus with scissors.

4. The danger of sympathetic ophthalmia is no greater after exenteration than after enucleation if a glass globe is not introduced into the emptied sclera.

5. Exenteration should be replaced by enucleation when sympathetic ophthalmia already exists.

Exenteration is indicated in the following cases :

(a) In panophthalmitis.

(b) In aged persons with arterial atheroma, or in absolute hemorrhagic glaucoma, or when enucleation may be followed by uncontrollable hemorrhage.

(c) In serious injuries, or when loss of a portion of the contents of the eyeball render enucleation difficult.

(d) In all cases where cosmetic effect plays the first rôle.

The Form of the Anterior Surface of the Lens.

DR. NICOLAI.—Not being satisfied with the measurements of the anterior surface of the lens made by optical methods, the speaker made plaster casts of this surface in the cadaver after removal of the cornea. He attributes to it a spherical form.

Acute Glaucoma Recovering without Operation.

DR. FABER.—The patient was sixty-one years old. Recovery was obtained by the use of pilocarpine, and there has been no recurrence for six months. In a case of hysterical amblyopia the author has been able to confirm the observations of Grœnouw (see *Annales d'Oculistique*, Vol. CXIII., p. 56) on the influence of accommodation in concentric narrowing of the visual field.

Treatment of Keratitis with Hopsopyon.

DR. SNELLEN, JR.—I do not propose to speak of mild cases of this disease, but of those which, in spite of the ordinary treatment, are followed by rapid and more or less extensive destruction of the

cornea. In these cases the method of Saemisch has been replaced in the ophthalmic hospital of Utrecht by a free paracentesis of the anterior chamber made in the non-suppurating portions of the cornea. A prompt diminution of the ocular tension is thus obtained without leaving the anterior chamber open for a prolonged period, as is the case in Saemisch's operation. If the hypopyon is reformed, issue may be given to the pus by reopening the paracentesis wound with a probe. Experience shows the superiority of this method.

The Influence of Cocaine on the Healing of Corneal Wounds.

DR. BLOCK.—Clinical experience has never shown me any harmful influence produced by instillations of cocaine on the healing of corneal wounds, as has been described by Dr. Mellinger. To elucidate this question, I have made identical corneal incisions in both eyes of a rabbit after cocoainizing one eye. Microscopical examination of sections of the enucleated eyes made vertical to the corneal incision showed that the reparative process was identical in both eyes at all stages of the healing.

A Case of Sub-conjunctival Cysticercus.

DR. JUDA (Amsterdam).—A cyst, 12 millimetres by 9 millimetres, developed in a boy six years of age, situated at the lower border of the internal rectus muscle and occupying the space between the lachrymal caruncle and the cornea. Its appearance was that of a serous cyst. The characteristic signs of the cysticercus of pork were not discovered until after extirpation of the little cyst. This error in diagnosis is the more excusable as this was the first case of sub-conjunctival cysticercus which has been observed in the Netherlands.

A Case of Epithelioma of the Cornea.

DR. SNELLEN, JR.—The case of epithelioma of the cornea was complicated with a corneal ulceration at the side of the little tumor. In spite of the long existence of the neoplasm, which had been apparent for six months, the epithelial proliferation had not invaded the tissues of the eyeball. The changes found in the ciliary body, the iris, the choroid, and the retina were of inflammatory nature.

A Case of Partial Embolism of the Central Artery.

DR. BOUVIN (The Hague).—The case of partial embolism observed by Dr. Bouvin was peculiar on account of the youth of the patient and the result obtained by the use of massage. The patient was a girl fourteen years old, who had noticed an obscuring

of the vision of the right eye two hours before her arrival at the clinic. With the ophthalmoscope, the classic picture of arterial embolism was seen. In two branches of the central artery, directed below and outward, the blood current was interrupted. Massage, practised immediately, caused the vision to increase from $\frac{3}{8}$ to $\frac{4}{4}$. On the next day, after a second massage, the interrupted blood current was re-established; the arterial branch directed outward remained, however, retracted. Four days later vision was $\frac{4}{4}$, and a slight narrowing of the visual field is the only persistent symptom of the embolism.

Pseudoscopy.

PROF. H. SNELLEN.—The speaker presented some hollow reliefs, which appeared convex when observed at a proper distance and with suitable illumination. He also showed some figures which in turn produced the opposite effect from the reliefs.

A Case of Simple Paralysis of the Sixth Nerve Consecutive to Pneumonia.

DR. WESTHOFF.—This paralysis of the right abducens occurred in a child two and a half years old three days after the appearance of acute pneumonia, located in the left apex. It reached its maximum at the same time as the pulmonary infiltration, and improved in proportion to the diminution of the latter condition.

SOCIETY OF GERMAN NATURALISTS AND PHYSICIANS

Session of 1894.

Keratoplasty.

DR. FUCHS (Vienna).—I can count to-day a total of thirty of these operations. The method consists in transplanting a corneal flap in its entire thickness, and it is applicable to corneal leucomas following interstitial keratitis and to ectatic cicatrices of the cornea. In eleven cases the keratoplasty was performed with the cornea of human eyes which had been enucleated. In the majority of cases the transplanted flaps became disturbed after a union which seemed at first favorable. In three cases, however, a slight amount of vision was obtained.

In ectatic and thin cicatrices the results were good in the sense that the transplanted flap produced a flat and solid cicatrix.

Dr. Wicherkiewicz (Posen) had performed a series of these operations, but with no permanently good result.

Dr. Fuchs.—The flap unites quite well, especially if it is taken from the human cornea. I have frequently seen the edge of the flap become fistulous.

Treatment of Inflammatory Affections of the Eyes by Electricity.

DR. VON REUSS (Vienna).—In all irritating affections of the cornea and of the sclera (keratitis, scleritis, episcleritis) the author recommends the following treatment: To apply a small platinum electrode (sclera button) directly to the diseased portion, the other electrode being placed on the cheek; to pass for a minute a current of 1 to 1½ milliampères. This treatment is not at all painful, and there is no irritative reaction (1).

Dr. Goldzieher (Budapest) uses successfully in scleritis an ointment of iodide of soda (0.25 and 10) combined with instillations of atropine or pilocarpine. Good results have been obtained in acute nodulated scleritis with warm baths and sudation.

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of March 5, 1895.

On the Consequences Which May Result from Infiltration into the Cellular Tissue of Liquids Injected into the Lachrymal Canal.

Discussion of the article by Dr. Leplat. (See Annales d'Oculistique, November, 1894, p. 328.)

DR. VALUDE.—Here is a case in which there was no injection into the lachrymal ducts, but which is sufficiently like the case published by Dr. Leplat to merit description in this discussion:

A man about sixty years old, who was troubled with lachrymation, had the canal incised and probed at the clinic of one of my colleagues. It seems that the first catheterization had been accom-

(1) Compare the treatment of irido-choroiditis and iriditis with continual currents (*Annales d'Oculistique*, September, 1894, p. 192) which was recommended by Pansier and myself.—**VALUDE**.

panied with tearing of the natural passage, and perhaps with a false passage, for the pain was very violent and accompanied with a sensation of tearing. Further, on the two following days a marked swelling of the region and of the cheek was found, with a large ecchymosis.

Nevertheless, a second, and afterwards a third, probing could be performed without much pain and without irrigation, at intervals of two days.

Seven days after the first probing I saw the patient, who complained of amblyopia on the side of the operation; two days later he could no longer count fingers at any distance, and perception of light hardly existed. The pupil did not react to light. With the ophthalmoscope, nothing remarkable was found; perhaps the papilla was a little redder than on the other side.

Two days after the first examination a new phenomenon attracted my attention; the eye projected slightly forward, as in exophthalmus, and the lids were somewhat swollen. Movements of the eyeball were, however, free and not painful. The eye and the orbit were the seat of indefinite pains which were not very severe.

The patient went to the country, and I did not see him again till ten days later. At this time the papilla was of a pronounced dark red color; the veins were tortuous and the arteries thinned. $V=0$.

Little by little the phenomena of atrophy became pronounced and vision remained completely abolished. Several months later the papilla became absolutely white and atrophic, and the exophthalmus disappeared.

The eye in question was formerly emmetropic and normal. It was the right eye, and the patient, a hunter, knew its quality.

What had happened in this case? Considering the absence of pain on moving the eyeball, I cannot assume the hypothesis of tenonitis causing the exophthalmus, but it is difficult not to admit that the forced catheterization had caused a circumscribed orbital cellulitis which had led to atrophy of the nerve by propagation of the neighboring inflammatory phenomena.

The primary source of the orbital infection, later communicated to the nerve, should, I think, be sought for in a tearing of the nasal canal at the time of the first catheterization, and perhaps in a false passage.

I think that tearing of the mucous membrane and false passages are relatively frequent when complete catheterization is practised with initial incision of the lachrymal opening and canaliculus.

From this case it may be seen that such accidents cannot occur without danger of serious consequences.

I am in the habit, therefore, of dividing the operation for simple stenosis of the lachrymal canals into two portions. At the first sitting I split the lachrymal opening and the canaliculus to a greater or less extent, according to the case; two days afterwards I attempt to introduce the sound. I thus guard against such accidents as that related.

Dr. Despagnet.—We owe special congratulations to our colleague, Dr. Leplat, for the scientific courage which he has displayed in relating a very unfortunate case; we should especially thank him for calling attention by this observation to an unfortunate case of too frequent occurrence, which, I have no doubt, may terminate in such a disastrous way. There is no doubt, in my opinion, that the probing tore the mucous membrane, and that it was by the breach thus made that the injected liquid, and with it the infectious germs, passed into the cellular tissue. Dr. Leplat, however, makes some reservations in this respect, for he says there was no resistance found in passing the sound in the upper two-thirds of the canal, and it was arrested at the first obstacle. But in all cases of complete obstruction of the lachrymal openings it is very rare to be able to pass sounds without tearing the mucous membrane, and that without feeling an obstacle to the movement of introduction, and we have as the most common proof of this the flow of blood from the nose when the sound is withdrawn.

It is true that Dr. Leplat did not have this proof, as his sound did not reach the lower extremity of the canal. It is precisely this almost constant tearing which caused me some time ago to modify my method in the fortunately rare occasions when I still resort to the use of the probe. For I was struck with the frequent infiltrations of the injected liquid immediately after withdrawal of the sound—infiltrations which, if they are exceptionally serious, as in Dr. Leplat's case, are always extremely painful. I always guard against following the passage of a sound with injection. I never perform the latter until two days after the probing, and always by employing the most gentle pressure. In this way, if the mucous membrane has been torn, the edges of the wound are already united and form a sufficient barrier to injections under moderate pressure. Dr. Leplat's accident confirms me still more in my method.

One thing which attracted my attention in Dr. Leplat's case was that after the injection there was no palpebral œdema produced by the infiltration, as is ordinarily seen in such cases.

The infiltration was then carried entirely backward. As for its mode of propagation, I suspect a lymphatic rather than a venous channel.

In my opinion the acute phenomena of the first two days were produced by the developing phlegmon of the sac. The transmission to the meninges in the three following days was gradually produced by the lymphatics, and the serious meningeal consequences were produced during the last two days. I lay no stress on the inaction during the seven days following the probing until the death of the patient. It is evident that the sac should have been opened after the second day, but Dr. Leplat was not called until the patient was in a state of coma.

I notice that Dr. Leplat thought he could not curette the sac, as he could not give the patient chloroform. I am greatly in favor of curetting, which I perform very frequently, and never anæsthetize my patients, as the operation rapidly performed is not painful.

Dr. Vignes had never seen sub-cutaneous œdema occur after injection performed immediately after probing.

Dr. de Wecker.—In Dr. Leplat's case the injection forced in, not only the antiseptic liquid, but also the septic contents of the sac. But the most powerful antiseptic fluid cannot kill the germs of pus; therefore, injection should never be made after incision of the sac.

Dr. Sauvinau.—The aim of catheterization is, among other things, to allow the injection to pass through. I am in the habit of preceding catheterization by the injection of a 1% phenic solution and following this by another. I have never had any accidents.

A Case of Sympathetic Keratitis.

DR. JOCQS.—A woman had lost one eye, which was reduced to a stump. The trouble dated from infancy, and was not due to traumatism. Recently the stump became painful, and simultaneously signs of keratitis developed in the other eye, characterized by an opacity especially pronounced in the upper portion of the cornea. I at first performed total peritomy, and the next day, attributing the disturbance to sympathetic origin, I removed the painful stump; it was ossified.

The symptoms of keratitis improved very rapidly, and vision returned.

I believe that the keratitis in this case was caused by a sympathetic irritation of the ciliary nerves, induced by mechanical irritation of the ciliary nerves of the deformed eye.

Dr. de Wecker.—The case reported by Dr. Jocqs is not precise enough to demonstrate the existence of sympathetic keratitis, and the improvement found after enucleation of the atrophied eye might also have been produced by the peritomy performed simultaneously.

Dr. Galezowski had seen several cases of sympathetic irritation, and, in his opinion, sympathetic irritation(?) was sufficient to explain the lesions on the opposite side. It is useless to consider the intervention of micro-organisms. This was also the opinion of Prof. Bouchard.

Dr. Abadie admits two varieties of sympathetic ophthalmia, one of ciliary origin, appearing in the form of cyclitis or iritis, and the other of infectious nature, starting insidiously by lesions of the fundus of the eye, and notably of the optic nerve. Dr. Jocqs' case was evidently a case of sympathetic ophthalmia of ciliary origin, and the peritomy probably had some influence on the recovery.

Dr. Despagne has a patient under his care at the present time who has had two attacks of sympathetic ophthalmia, the first taking the form of irido-cyclitis, and the second, occurring several months after, being characterized by optic neuritis. In which category would Dr. Abadie class this case? There must be a mixed form. Keratitis secondary to cyclitis, as well as descemetitis, quite frequently accompanies sympathetic changes.

Dr. de Spéville has seen in some patients having serious affections of one eye slight disturbances of the other eye without inflammatory symptoms. These disturbances have disappeared after enucleation. He thinks this a reflex sympathetic ophthalmia.

Dr. Terson.—Dr. Jocqs has given an important role to the sensory nerves, but he has not told us if he examined the sensibility of the cornea.

Dr. Jocqs.—I do not think that the peritomy explains the improvement. A methodical examination of the corneal sensibility was not made, but this membrane appeared to have its normal sensibility. The keratitis was uncomplicated, for, after clearing the cornea, no lesion revealing participation of the iris in the inflammatory process could be found.

Does Traumatic Amblyopia or Amaurosis from Reflex Action Exist?

DR. L. DE WECKER.—The title of my article, thus presented in the interrogative form, was suggested by the case which Dr. Trouseau described at our last session. It will first be necessary for me

to recapitulate this case, emphasizing the various points which appeared to me most worthy of discussion.

A girl, fourteen years old, after being struck by her music teacher quite violently in the left eye with a sheet of music, stated that a foreign body (a piece of paper) had entered the eye, and declared that she progressively lost the sight of this eye, which remained red, sensitive, and lachrymating for fifteen days. Afterwards these symptoms of irritation disappeared, but vision continued to change, so that, according to the girl's statement, three months after the accident it was completely lost on the injured side.

Three physicians were successively consulted, but the absolute blindness remained, and, as a last resort, a consultation *extra muros* was advised. The girl, however, continued to affirm that a piece of paper had entered the eye. At length, the mother brought her to our colleague, and begged him to make a careful re-examination of her child's eye. This was in the month of July—that is, six months after the injury had been received—and it was not until this time that any one had thought of carefully exploring the eye by evertting the eyelid, and then a piece of paper was discovered, much macerated, and covered with mucus.

I know my excellent colleague too well to suppose for an instant that, while regretting this tardy exploration, he did not then make a very thorough examination by passing along the cul-de-sac a spatula or a Daviel currette, in order to sweep the entire extent of the insensitive conjunctival sac. If, after such a procedure, a second piece of paper was found on the next day near the inner angle of the eye, it could not be doubted that this second foreign body had been introduced into the eye by the girl herself, as the first one probably had been.

After the extraction of the second fragment of paper vision returned completely in the space of fifteen days. My colleague, it is true, does not make a categorical statement in his article on the nature of the affection, but there is no doubt that he entertained the ideas of his young patient, as the title of his article shows: "A Case of Traumatic Amblyopia."

Light could have been easily thrown upon this etiological point. It would have been sufficient to preserve the *corpus delicti* and to compare the piece of paper extracted from the conjunctival cul-de-sac with the peculiar paper used in the manufacture of sheet music, a paper remarkable for its thickness and its resistance: further, it must be granted that the paper was very much decayed, for a piece of it thus to be broken off and enter between the lids.

I think that what led my colleague to trust the statement of his young patient, so apt in trickery, was the mydriasis which had been observed at a time when strict surveillance rendered its artificial production absolutely impossible. Here is his statement: "I noticed considerable mydriasis and anæsthesia of the upper lid. The mydriasis did not prevent the pupil from reacting to light, though very slightly."

When my colleague read his case at our last session I suggested that in the absence of vision the term amaurosis should be substituted for amblyopia in the title of his article. I will add that the term mydriasis should not be used when the motility of the iris is preserved. The patient simply had what would have been very difficult to produce artificially, an inequality of the pupils, a symptom so common in anisometropia, neurasthenia, hysteria, etc., but to which no great importance should be attached.

If I have possibly laid too much stress on the vulnerable points of this case, it is because it is peculiarly open to attack, which, in my opinion, should be directed against the pretended traumatic reflex; but I do not for an instant wish it to be thought that I wish to single out my excellent colleague, as all observations of this kind deserve criticism, my own included.

Allow me to say in this connection that there are thousands of cases reported of prolonged sojourn of a foreign body in the conjunctival sac, and that there are barely a few in which reflex reaction has been observed on the functions of the retina or optic nerve.

Cannot thousands of cases of persistent dental neuralgia be estimated, caused by caries and periostitis, and yet how rare are the cases of reaction on the part of the visual organ. Dr. Courtaix has recently published, under the title "Clinical Researches of the Pathological Relationship between the Eye and the Teeth," a series of cases which he has carefully collected from literature, and yet how few in number they are. A hundred cases.

Observe what has become of the so formidable amblyopias and amauroses following injuries of the region supplied by the supra-orbital nerve since the immortal discovery of Helmholtz, which permits us to find that in traumatism of the supra-orbital region there are direct disturbances of the optic nerve, most frequently occasioned by fissures of the optic canal. It is the same when an infectious focus in the gums, following dental caries, is complicated, exceptionally, by disturbance of the optic nerve; an anatomical anomaly may here intervene to explain the propagation of the infection without the necessity of invoking reflex action.

In conclusion, allow me to make a last reflection. If a perfect exactitude in the wording of observations should be the rule in our specialty, and that especially in virtue of a language so concise as the French a rigorous precision is more than ever imposed, to interpret certain facts, venturing on a ground so unreliable as reflex action, particularly when this action should be exerted from a nerve of general sensation to a nerve of special sense like the optic nerve.

Dr. Abadie.—I have seen children with amblyopia or amaurosis who could clearly be accused of simulation, but there also are cases where hysterical amblyopia cannot be doubted. In these cases, the use of a magnet may be an excellent method of diagnosis. I know of no cases outside of the authentic ones reported of blindness from reflex action.

Dr. Parinaud.—In a communication *On Reflex Hystero-traumatic Amaurosis and Amblyopia* (Ophthalmological Society of Paris, 1889) I said that probably these amblyopias did not exist. I described cases of amblyopia, or amaurosis of hysterical nature, caused by peri-ocular traumatism, and also a case of amblyopia combined with the presence of tænia, which was likewise of hysterical nature. Apparently, all the cases of amblyopia or amaurosis attributed formerly to reflex action are related, on the one hand, to compression or tearing of the nerve in cases of fracture of the base only revealed in some cases by this one symptom, and on the other hand to traumatic hysteria. But many oculists do not care to recognize traumatic hysteria. Without taking the pains to make a thorough examination, they prefer to call it simulation.

Among the traumatic hysterical amblyopias there is one variety which it is particularly useful to know, because it may be confused with sympathetic disturbances. In three patients who had one eye enucleated on account of injuries, and who complained of disturbances in the remaining eye, I found amblyopia, supposed in one case to be sympathetic ophthalmia, which was clearly hysterical. Two of these patients had been operated upon by me, not for sympathetic disturbances, but because the eyes which were injured and lost remained painful. I cannot say whether the hysterical trouble preceded or followed the enucleation. Dr. Morax told me that he had seen a similar case at the Bichat hospital.

I also remember seeing in Charcot's service a patient who had an eye enucleated for pretended sympathetic disturbance. The visual troubles, far from disappearing, were more aggravated. I found that they were due to hysterical amblyopia. The patient has recently had severe attacks.

Dr. Parent.—Does Dr. de Wecker also deny the reflex origin of amblyopia occurring in the course of affections of the female organs which he described in his treatise?

Dr. de Wecker.—I have altered my opinion on the nature of this form of amblyopia and think that perhaps it is of infectious origin. Dr. Abadie says that some children simulate, and that the cause cannot be found; I think that the cause is simply a desire to come to Paris.

Etiology of Ulcerations of the Cornea in the Course of Cholera.

DR. GORECKI read a review of an article on this subject by Dr. Garlinski (Warsaw). I have two theories to explain the corneal lesions in the course of cholera: the theory of desiccation, and the neuro-paralytic theory of von Græfe. Garlinski gives a third, also quite theoretical, and which supposes lesions of poisoning.

False Lenticonus.

DR. JAVAL.—Review of an article by Dr. Demicheri (see *Annales d'Oculistique*, February, 1895). In connection with the facts published by Demicheri, Javal relates a case which he has followed for many years, and which was characterized by the appearance of a high degree of myopia at the age of fifty-five, in a person formerly emmetropic.

Dr. de Wecker.—These facts are of great practical importance, and it was Critchett who first called attention to the appearance of myopia in aged persons who ultimately had cataract. It should be known that this myopia may reach a high degree.

MEDICAL SOCIETY OF BUDAPEST

Session of January 26.

Absolute Blindness Caused by a Vermifuge.

DR. GROSZ.—A man twenty-nine years old had somewhat weak vision in the left eye, but perfect vision in the right. He was suffering from his stomach, and went to a pharmacist, who gave him a vermifuge, consisting of capsules of ethereal extract of male fern and extract of pomegranate; each capsule contained about 0.25 gramme of this combined medication. He took 32 of these capsules—that is, about 8 grammes of the medication—after previously taking castor oil.

In the evening he had syncope. The next day he had severe diarrhoea, and two days later he was blind in both eyes.

On examination there was complete mydriasis, and the pupils did not react at all to light. At first the fundus of each eye was normal, but little by little both lost their color and became atrophic.

The author thinks that the noxious influence here was the extract of fern, which is toxic in doses of 4 to 5 grammes ; perhaps, also, the castor oil previously taken reinforced the toxic action.

MEDICAL SOCIETY OF BERLIN

Session of February 20.

Ocular Tuberculosis.

DR. SILEX reported the case of a child six years old who presented the most typical form of tuberculosis of the iris. Experimental inoculation in rabbits was conclusive. In spite of the clearness of the case the author did not dare to employ injections of tuberculine then in vogue, because it had not given satisfactory results. He was content with external washes of boracic acid solution—that is, the treatment was *nil*. Afterwards the child went to the country. When he returned Dr. Silex was surprised to find that the tubercular nodules had disappeared completely.

What result would have been obtained in this case with the use of creosote, iodoform, and especially injections of tuberculine !

It is, then, well to know that ocular tuberculosis may recover spontaneously.

ANATOMICAL AND PHYSIOLOGICAL SOCIETY OF BORDEAUX

Session of February 11.

Sub-conjunctival Cyst of Dermoid Origin.

DRS. PUECH and FROMAGET.—A woman, forty-one years old, had at the lower orbital border quite an apparent swelling, which diminished gradually toward the commissures and gave the idea of a tumor

in the lid. The border of the lower lid was well applied to the ocular conjunctiva.

In endeavoring to find the consistency and situation of the tumor it was felt to escape from under the fingers, and on forcibly drawing down the lower lid a cyst the size of a pigeon egg immediately shot forward.

The envelope of the cyst appeared to be quite thin. Its bluish-white color allowed a transparent serous liquid to be seen, somewhat suspicious-looking, and having in its lower portion a creamy-white mass.

As the patient refused to have it completely extirpated, I drew off the fluid and partially resected the wall of the cyst.

The fluid, on withdrawal, soon coagulated like the fluid from pleurisy, and I found in it some scattered epithelial cells, red corpuscles, and quite a large number of pus corpuscles.

The wall was composed of very lax conjunctival tissue which did not differ from ordinary sub-conjunctival tissue, and was covered within with several layers of polygonal epithelial cells, more or less flattened, whose nucleus, protoplasm, and envelope were very distinct. This was, then, a variety of *congenital dermoid cyst*, which arose from inclusion of a portion of the conjunctiva, and which had remained a long time unnoticed.

ROYAL ACADEMY OF MEDICINE OF IRELAND

Session of January 4, 1895.

MR. STRONG had operated on 100 cases of cataract. In 8 cases vision was less than $\frac{1}{16}$, and in three cases, although the operation was successful, there was only perception of light on account of a former affection. In 42 cases the operation was performed without iridectomy, in 46 with iridectomy, and 12 extractions were performed after preparatory iridectomy.

The principal factor in the success was antisepsis, and the author is unable to say whether he prefers the simple or combined extraction. He makes a flap of three millimetres, as recommended by Dr. de Wecker.

Mr. Swanzy in 270 operations had only had 2 cases of panophthalmitis. He everts the lids and irrigates the eyes with a $\frac{1}{10000}$ solution of sublimate. The instruments are plunged in boiling water and then in a weak carbolic solution.

Mr. Story bathes the eyes with a boiled solution of boracic acid. He everts the lids and irrigates the eyes with a bichloride solution, 1 to 10,000.

The instruments are immersed in boiling water, and then in a weak carbolized solution.

Mr. Story washes the eyes with a solution of boric acid which has been boiled.

MEDICAL SOCIETY OF PLYMOUTH

Meeting of the 29th December, 1894.

Glaucoma.

DR. ELLIOT SQUARE has seen numerous cases of glaucoma which physicians have failed to recognize and have mistaken for cataract. This error should not be committed.

After doing homage to von Græfe and Helmholtz, the author describes the various forms of this affection, which are the acute, chronic, and secondary.

Eserine, either alone or in combination with cocaine, is all that is necessary to relieve the first symptoms and keep the case along until iridectomy shall be performed. In case of blindness following infantile glaucoma, the eye must be enucleated.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Albrecht von Graefe's Archiv für Ophthalmologie

Reviewed by Dr. V. MORAX.

Vol. XL., No. 5.

I.—Upon the Color Reactions of the Retina Exposed or Not Exposed to the Light, by Prof. BIRNBACHER.

The experiments of Angelucci, Van Genderen Stort, Engelmann, Gradenigo, and Dennisenko have demonstrated that the component parts of the external layer of the retina exhibit notable differences, according to whether this membrane was or was not exposed to the

light immediately before fixation. Angelucci and Chodin, moreover, noted that light produced chemical changes in the retina. The retinæ of frogs which have been kept for some time in the dark always give an alkaline reaction, while those which have been exposed to the light give an acid reaction, the degree of acidity depending upon the time of exposure. In the study of these phenomena Birnbacher used the histo-chemical reagents so ingeniously applied by Ehrlich to the study of leucocytes. For the purpose of experiment, salamanders, frogs, and fish were used, among the latter the perch (*perca fluviatilis*), in which the cells of pigmented epithelium and the cones are especially well developed. After being either exposed to the light or kept in the dark the eyeballs were enucleated and immersed in the fixative reagent (nitric acid, 3.5%, or acid bichloride).

The fixation, hardening in alcohol, and inclusion were always performed simultaneously, whether the eyeballs had or had not been exposed to the light. For the staining, the various aniline colors were used, but the "Biondi-Heidenhein" mixture (eosine and methyl green) is the one which has given the best results. The differences in coloration between retinæ exposed to the light and those which have been kept in the dark are constant.

In the specimens of retinæ exposed to light and stained with acid reagents (eosine), the coloring is light and diffused. In those not exposed to light, the ellipsoid of the cone is stained a deep rose color (eosine) or blue (acid violet), the other portions of the retina remaining colorless.

With the Biondi-Heidenhein mixture, the cones are green in retinæ exposed to the light, and yellow in those which have been kept in the dark. Evidently, then, under the influence of light, some of the retinal elements undergo a change in their chemical properties; this does not imply that the action of light is confined to the cones, or that it occurs within the interior of the ellipsoid of the cone. From these experiments we see that the same element may be acidophile or not, according to whether it be in a state of functional activity or rest.

II.—Researches into the Physiology of the Diameter of the Pupil, by Dr. O. SCHIRMER.

If we exclude the influence of convergence, of accommodation, and of psychical or sensory stimulation upon the diameter of the pupil, we see that this diameter in any particular eye depends, not alone upon absolute light, but also upon the influence of another

factor, the retinal adaptation. In passing from darkness or from light into a medium light the result is not the same. In the former case, the pupil will be very narrow; in the latter, it will be large. Schirmer has endeavored to ascertain the influence of retinal adaptation upon the diameter of the pupil. With this view, he had a pupillometer constructed, the most ingenious part of which consists in the use of a prism which allows of the examination of the pupil from one side without throwing any shadow upon the eye. The result of his observations is as follows: Just as the modifications of light (the adaptation remaining the same) cause changes in the diameter of the pupil, so do modifications in the state of adaptation (the external light remaining the same) cause a contraction or a dilatation of the pupil.

When the adaptation of the retina has attained its maximum, the pupillary diameter remains the same (of course, excluding the influence of convergence, accommodation, and psychical and sensory stimulation). This is the pupillary diameter which Schirmer considers to be the physiological diameter. The pupillary diameter, therefore, and pupillary reaction, depend upon the relation between the external light and the condition of adaptation of the retina.

III.—*Ophthalmo-tonometric Studies*, by Dr. F. OSTWALT.

The author made comparative experiments with various tonometers, especially those of Maklakoff and Fick. The former gave very useful comparative results, while the latter gave absolute measurements—that is to say, the figures obtained correspond to the real tension estimated by a column of mercury, but its use necessitates some skill. Ostwalt believes that these tonometers are sufficiently practical to replace exploration by touch, according to Bowman's old method, in the clinical or scientific study of certain cases. Ophthalmo-tonometry would seem to have entered upon a new phase of its existence, and one (shall we say?) full of promise.

IV.—*Vision in Myopia*, by Dr. H. TRIEPEL.

No distinction has as yet been made between the visual acuteness (estimating the retinal sensitiveness after correction of ametropia) and the visual powers of a non-corrected eye, or perhaps we should rather say that the same form of expression, "visual acuteness," is used to indicate these two different functions of the eye. We find very little in medical literature about the sight of the ametropic eye (non-corrected) outside the theory of the vision in the circles of diffusion. In his work Triepel has endeavored to fill this gap, es-

pecially in what relates to myopia. His experiments were made upon the pupils of a school in Leipzig, upon 388 eyes affected with simple myopia, or myopia complicated by astigmatism, or simple astigmatism. Tests of vision were made by means of Snellen's Types placed at a distance of 6 metres. A comparison of the results obtained in various subjects whose degree of myopia was the same, and at various ages, leads Triepel to the following conclusions :

1. In the myopes from nine to twenty years of age sight (non-corrected) is better the older the patient.

2. The wearing of glasses for distant objects diminishes the power of vision, while glasses for near objects may improve it.

3. Astigmatism makes the sight of a myopic or emmetropic eye worse, but vision is nevertheless better than if all the meridians of the refractive system possessed the refractive power of the most refractive meridian.

V.—Vision in Circles of Diffusion, by Dr. SALZMANN.

In a previous note which appeared in Vol. XXXIX. of *Gräfe's Archives* the author endeavored to outline the theory of the circles of diffusion, with the object of bringing out some of the symptoms of a high degree of hypermetropia. He easily demonstrated that a hypermetropic eye performs its functions in a manner nowise different from that of a myopic eye, and that consequently the laws of sight in the circles of diffusion are the same for all normal eyes. From an optical point of view, the identity of the circles of diffusion in myopia and hypermetropia were evident, but the demonstration of this identity from a functional standpoint still remained to be done. In this second *Mémoire* Salzmann makes a study of the vision in the circles of diffusion, leaving refraction completely out of the question.

We will not follow the author through his formulæ and his curves, which lead to the conclusion that so-called distinct vision is merely a particular kind of vision within the circles of diffusion, and that they both obey the same laws, the difference between them being not qualitative, but quantitative.

VI.—Upon the Clinical Forms of Diphtheritic Conjunctivitis, by Dr. O. SCHIRMER.

It is many years since any case of diphtheritic conjunctivitis has occurred at Greifswald, although there has been a serious epidemic of pharyngitis. On the other hand, Schirmer has observed cases of croupous conjunctivitis complicated by corneal lesions of far greater severity than those usually noticed, a fact which induced him to

make bacteriological examinations of these different cases. The presence of the bacilli of diphtheria was proved by cultures, and their virulence by the inoculation of guinea pigs.

The clinical appearance was that of croupous conjunctivitis; the eyelids were not indurated; the false membranes were easily removed. The subjacent mucosa was not ulcerated. Cures occurred without leaving cicatrices. This croupous conjunctivitis was, however, caused by the virulent bacillus of diphtheria. How shall we explain the fact that this bacillus will at one time cause a true diphtheritic conjunctivitis, and at another, a croupous conjunctivitis? Schirmer does not settle this question, but merely calls attention to the fact that in the cases examined by him the number of colonies obtained upon serum was small and the degree of virulence of the bacillus not high. Can we, from a clinical point of view, differentiate between croupous diphtheritic conjunctivitis and croupous non-diphtheritic conjunctivitis?

Without definitively answering this question, Schirmer believes that we should decide in favor of croupous diphtheritic conjunctivitis when, in children from two to seven years of age, extensive pseudo-membranes develop upon the whole tarsal cartilage and in the cul-de-sac, especially if the affection is unilateral, if the false membranes are easily removed, if the subjacent conjunctiva is hyperæmic and bleeds readily, if the eyelids are swollen, and, finally, if the affection is very painful. The diagnosis is rendered still more positive if any possibility of contagion can be established, if upon the inflamed conjunctiva small adherent exudations are found, and if upon the cornea there are superficial, diffuse, and extended opacities.

The treatment prescribed in these different cases, which receives Schirmer's approval, consists in applications of ice and in frequent washing with a 1 to 5,000 bichloride solution. He, moreover, advises protection of the unaffected eye by occlusive dressings.

In spite of their clinical differences, he believes it preferable to classify these cases etiologically, under the name of diphtheritic conjunctivitis.

We would call attention to the fact that these same conclusions may be found in a *Mémoire* by Sourdille, which was published six months before the one under discussion. The author does not seem to know of this work.

VII.—Extraction of a Piece of Glass from the Anterior Chamber, and Reflections upon the Inflammation Caused by the Foreign Body, by Dr. A. WAGENMANN.

Basing his opinion upon experiment, Leber held that glass cannot be considered completely inert from a chemical point of view,

and that when introduced into the anterior chamber, not only the mechanical action must be taken into account, but also the chemical, an action which is, however, very slight. Wagenmann had the opportunity of following for a year the case of a patient within whose anterior chamber was a fragment of glass. The foreign body had penetrated through the cornea by a wound which had rapidly cicatrized, and neither the iris nor the crystalline lens had been injured. It had lodged in the inferior irido-corneal angle. A slight turbidity was distinguishable, six months after the accident, at its point of contact with the cornea, while the tissue of the iris involved was a little thickened. The anterior chamber seemed to be a trifle deepened. The pupil was normal, although it appeared to be drawn downward a little; there were no reactive phenomena in the eye, but after each examination there was some ciliary injection. Ten months after the accident this ciliary injection had become a permanent condition, and was increased by examination. Moreover, a parenchymatous, triangular opacity had developed upon the lower half of the cornea. A slight diminution of visual power was the result of this opacity. The iris was slightly thickened at the point of contact with the foreign body. The ciliary injection continuing to increase, the patient consented to an operation. A transverse incision, 6 millimetres long, in the lower part of the cornea, allowed of the removal of the fragment of glass with forceps. The fragment was at once put into a tube of gelatine. The nutrient medium remained sterile. The after-results of the operation were quite simple, and the ciliary injection completely disappeared.

Wagenmann believes that the slow and progressive development of the inflammatory process cannot be attributed to mechanical action alone, more especially as the foreign body was immobilized.

VIII—Congenital Bilateral Cataract with Perforation of the Crystalline Capsule in the Rabbit, by Dr. HERMANN VUELLERS.

The author made a histological examination of the eyes of a rabbit in which, from birth, had been noticed bilateral cataract. There were no corneal lesions nor cicatrices of penetrating wounds. The anterior part of the capsule of the lens of one side showed some solution of continuity, but upon the other side it was intact. The lens had undergone retrogressive changes; its size was less than normal.

How are these lesions to be explained? Vuellers believes that they were due to traumatism occurring during foetal existence, the

traumatism having either occurred upon the mother's abdomen or else a second foetus having hit the one whose lesions form the subject of this paper.

IX.—Contribution to the Study of Tuberculosis of the Lachrymal Glands, by Dr. F. SALZER.

The first cases of tuberculosis of the lachrymal gland were reported by Lapersonne and Müller. Baas added two new cases. Salzer made a study of one. It was that of a girl of fifteen years, from whom Ozerny removed a little mass of tuberculous ganglia from the cervical region, and a small tumor, the size of a pea, situated beneath the upper left eyelid, which had developed three years previously. This tumor was hard, movable beneath the orbital arch, painless, and non-adherent to the skin. Macroscopic examination showed an alveolar structure. Microscopic examination revealed, in the midst of the more or less altered glandular tissue, an infiltration of round cells, and here and there nodular infiltrations with lymphoid cells, and a few occasional giant cells. No tubercle bacilli were shown by the use of coloring agents, and inoculation was not performed. Salzer thinks that the macroscopic appearance of the lesions in this case are sufficient to establish the diagnosis of tuberculosis. This case serves him as a basis in refuting the theory of the interstitial development of tuberculosis, and in upholding that of the active participation of parenchymatous tissue in its formation. As may well be imagined, the refutation is purely speculative, and stands a chance of convincing nobody.

X.—Hepatic Ophthalmia, by Dr. K. L. BAAS.

Medical literature contains but few exact data proving a relation between certain hepatic affections and lesions of the eyeball. One of the oldest reports is that of Bischoff and Müller, who noticed the development of amblyopia without lesions of the transparent media in two dogs in which they had previously created biliary fistulæ. At the autopsy they found an atrophy of the external layers of the retina, with abundant deposit of pigment. The lamina pigmenti was atrophied in places. The hyaloïd was thickened in spots, and in corresponding portions of the vitreous there was an infiltration of leucocytes. Here and there the retina also was infiltrated and cedematous. Müller considers that these lesions were the result of the biliary fistula.

A little later Junge reported the case of a young man suffering from cirrhosis of the liver, in whose retina were found hemorrhages in the layer of nerve fibres, and degenerated cells between the exter-

nal and internal granular layers. Stricker, Förster, and Litten all had cases of retinal hemorrhage in hepatic affections with icterus. In 1872 Landolt reported two cases of pigmentary retinitis with cirrhosis of the liver, but in his cases both the retinitis and the hepatic affection were of long standing.

As to functional troubles, hemeralopia was noticed by Bamberger and Frerichs, who attributed it to the icterus and to disorders of nutrition. At about the same time Cornillon and Parinaud reported cases of hemeralopia in certain hepatic affections with icterus.

In his profound work, Parinaud shows the relation between hemeralopia and changes in the visual purple, and lays stress upon the absence or weakening of visual power, the functions of the macula.

Leber quotes the case of a patient of fifteen years of age, suffering from hypertrophic biliary cirrhosis with icterus, who became hemeralopic, the visual power and field of vision remaining normal. Weiss noted a woman who, in the sixth month of pregnancy, had intense icterus and promptly became amaurotic. Microscopic examination showed an infiltration of leucocytes in the choroid, especially in the external and middle layers. To this list Baas adds two new cases, which we append because of the great interest of the subject.

I.—Young man of twenty years, giving no history except that of osteo-myelitis of the humerus at twelve years of age. In 1892 he noticed an increase in the size of his abdomen without cutaneous icterus, but coincident with mahogany-colored urine. Shortly afterwards he had an attack of hemeralopia, which lasted three months. At the end of 1892 he was attacked by diarrhœa, with high fever and icterus. Dating from that time, his physician has noticed marked hypertrophy of the liver and spleen. In July, 1893, he again suffered from hemeralopia. By the aid of Förster's photometer, a certain degree of retinal torpor was found. There was also slight xerosis of the conjunctiva. The crystalline lens was the seat of numerous white opaque spots. The fundus of the eye appeared to be slightly opalescent, as though there were a slight granular turbidity. The visual power and field of vision were normal. This attack also coincided with icterus, and hypertrophy of the liver and spleen. In December, 1893, the ocular disturbances again disappeared, while the general phenomena became less. Since that time there has been no hemeralopia.

II.—Youth of sixteen years, without hereditary taint. At seven years of age he was seized with vomiting coinciding with icterus and obliged to remain in bed six weeks. At fourteen years he

for the first time noticed marked hemeralopia. The following year, the icterus and vomiting reappeared with cephalalgia; the hemeralopia was still more marked, and this induced him to consult a physician. It was at this period that Baas first saw him, and found decided icterus, hypertrophy of liver and spleen, and slight œdema of the lower limbs. There was no albumen in the urine. Ocular examination showed visual acuteness which was very slightly diminished, visual field and color-perception normal. By means of Förster's photometer, marked retinal torpor was found. Special lesions were found in the fundus of the eye, consisting of tenuity of the pigment and a slight turbidity of the retina up to the edges of the papilla. The arteries seemed to be a trifle pale. At the centre small white points deprived of pigment were seen by the side of foci of pigment. There was, in addition, xerosis of the conjunctiva.

During the fifty-six months that the patient spent in the hospital the hepato-splenic disorders persisted; the icterus was more or less marked, there was no abatement of the hemeralopia. The patient died with symptoms of hepatic asystole. At the autopsy hypertrophy of the spleen was found, and cirrhosis of the liver with icterus and numerous hemorrhages.

A microscopic examination of the eyeball was made by Baas, who found generalized vascular lesions in all the vessels of the eye, especially marked near the choroid, in the form of endarteritis and endophlebitis. Hyperplasia of the vascular wall and diminution in the calibre of the blood vessels produced modifications in the circulation. The changes in the pigmentary epithelium (atrophic changes) must be considered as a consequence of the lesions of the choroid. To these lesions of the circulatory system must also be referred the slight œdema of the papilla and of the retina, as well as the foci of cellular infiltration (white spots). Hemeralopia may be laid to the charge of lesions of the pigmented epithelium, whose role in the production of the visual purple seems to be well established. As this epithelium derives its nourishment from the chorio-capillaries alone, it is easily seen how the secretory conditions are modified by the vascular lesions. Baas attributes these vascular lesions to the icterus; he suggests that to these ocular alterations be given the name of *cirrhosis of the choroid*, and to differentiate the affection by the term *hepatic* or *icteric choroiditis*.

XI.—Accommodation and Convergence, by Dr. ALFRED GRAFE.

In a work upon the "Results of the Operation for Strabismus," Schweigger holds that accommodation and simple binocular vision

(the tendency to fusion) are all-sufficient to account for all the phenomena relating to the subject, and he does not believe in the intervention of a third factor, which Hansen Grut has called the "sense of convergence" (*Nahebewusstsein*), and which the author calls the effort of convergence" (*Convergensbestreben*). The author draws attention to the fact that when any object is fixed within the punctum proximum in a presbyopic patient, and outside of the punctum remotum in a myopic patient, by placing a small screen before one eye, the two eyeballs take the exact corresponding position, although under these conditions there is neither fusion nor accommodation. Schweigger says, in opposition, that, in presbyopia, if accommodation is no longer manifested by the same optical effect, because of changes in the crystalline lens, the innervation of accommodation persists from the force of habit. He, moreover, states that, in the myopic, divergence is the rule under the conditions indicated above, and that it is exceptional to see the eyeballs take the position corresponding to the distance of the object. However that may be, we must look for the cause of this phenomenon, whether it be exceptional or not, and for its explanation, to admit the third factor—effort of convergence. Physiologists have interested themselves only in fusion and accommodation, and that we can understand because, in the emmetropic, and under normal conditions, these two phenomena are enough to explain the visual phenomena in question. But that does not imply the non-existence of this force, which under normal conditions remains latent, appearing only when the normal conditions are changed. It can, moreover, not be admitted that the necessity for directing the optical axis of one eye upon a point fixed by the other causes the development, from habit and exercise, of a need of direction, separate from accommodation up to a certain point, and constituting a more or less independent mechanism.

IV.—BOOK NOTICES

BOOKS AND THESES

Inflammation of the Sinuses and Its Consequences,
by Dr. HERMANN KUHN. (267 pp. Wiesbaden: Bergmann, 1895.)

In a monograph, which is as complete as it is profound, Kuhn expounds the nosography and pathological anatomy of inflammation of the frontal sinuses to its remotest detail. The cases which form the foundation of this truly classic work have been gathered, not only from ophthalmological literature, but from periodicals of general surgery, rhinology, laryngology and general medicine. Kuhn's book is therefore as interesting and useful to the general practitioner as to the specialist. According to the nature of the secondary dis-

orders following inflammation of the frontal sinus, this affection will fall to the lot of the rhinologist, surgeon-oculist, or general practitioner (meningitis). A complete work upon this subject must, therefore, comprise all medical literature. To this author belongs the credit of having attempted and succeeded in accomplishing a work so extensive.

The cases which are brought to the oculist are usually serious ones with dangerous complications. Simple, chronic cases, with periodical exacerbations, belong chiefly to the rhinologist and the general practitioner. The many cases reported in this work prove the link existing between the light cases of chronic rhinitis propagated to a certain part of the mucose of the sinus, and the severe cases producing extensive necrosis of bone and causing death by meningitis or by cerebral abscess. In regard to the symptomatology, we must content ourselves with a mere mention of its polymorphism; to attempt anything more would be to go beyond the limits of a review.

Affections of the maxillary, ethmoidal, and sphenoidal sinuses are described, perhaps a little too briefly. In recent works upon inflammations of the sinuses there is a great deal of "old new." The author has endeavored to give credit to the proper authorities of clinical discoveries as well as of therapeutic measures, a task the difficulty of which can only be realized by recalling the vast extent of the literature upon the subject and the frequent impossibility of tracing things to their sources. One should beware of quotations. The author was led into error by trusting to the authority of the famous G. A. Richter. He says, on page 114: "It is a mistake to attribute the opening of the anterior wall of the maxillary bone to Desault. G. A. Richter quotes it without reference to Larmorier." Desault's process is different from that of Larmorier. The latter proposed opening the lateral wall of the maxillary sinus above the alveolar border, below the maxillary apophysis, after having separated the commissure of the lips and raised the upper lip. Desault opened the anterior wall at the canine fossa. In actual practice Larmorier's process, so far as we know, has been abandoned for that of Desault, whose name it rightfully bears.

The very unimportant nature of our criticism proves that in Kuhnt's book there is really nothing to criticise. By reading it one obtains new views and new lights upon the old views of inflammations of the sinuses, and will be likely to search for an affection of the sinuses in many cases where the diagnosis had previously remained symptomatic (migraine, neuralgia).—SULZER.

Apparatus for Instruction in Ophthalmoscopy, by Dr. WEISS.

The apparatus designed by Weiss is likely to greatly facilitate instruction. Two large plates of ground glass are mounted in such a way that behind them one can insert various pictures representing the fundus or parts of the fundus of the normal eye. By moistening the ground glass with water or oil, it is rendered transparent, and upon it can be arranged drawings of various affections revealed by the ophthalmoscope.

The drawings used by Weiss for this purpose are well made. They represent a normal fundus and a papilla. By superimposing two or more plates of glass, one can follow the steps in the progress of a disease.

MISCELLANY

CORRESPONDENCE

We have received from our esteemed colleague, Dr. Leplat (of Liège) the following letter :

LIEGE, February 15, 1895.

MY DEAR COLLEAGUE :

In the January number of *Annales d'Oculistique* Dr. Darier reports a case of chronic irido-choroiditis in which he saw the development of vessels upon the anterior surface of the capsule of the crystalline lens. The case seemed so extraordinary that at first he was in doubt as to the actual position of the vessels being such as it appeared, and that he now feels it necessary to give the reasons which made him reject the idea of a persistent pupillary membrane. He finally reaches the conclusion that this vascular tuft must have originated from a pupillary exudation. I have never seen a similar new formation following idiopathic irido-choroiditis, but twice in the past two years I have seen it in eyes suffering from traumatic irido-choroiditis. As it may prove of interest to your readers, and to Dr. Darier especially, I will give you a brief history of the cases.

Upon the 6th of last December, Leon L——, twelve years of age was watching a workman fasten telephone wires to the top of a pole

when a piece of copper wire fell into his right eye, from which he himself removed it. On the 9th of December he came to consult me, and I found the eye greatly injected. There was a wound with infiltrated edges situated upon the cornea, between the centre and the external boundary; a large hypopyon was in the anterior chamber. I punctured the cornea to evacuate the pus. The aqueous humor which was reproduced was, as usual, filled with fibrin; this contracted, and finally ended by forming a thin membrane upon the anterior surface of the capsule of the lens. This membrane diminished by degrees, and at last disappeared. When the aqueous humor had become clear again, and the corneal wound was healed, I found that the copper wire had gone through the iris. The eye softened, sight was lost, the iris atrophied, the pupil became yellowish-white in color, and the anterior chamber was obliterated. In spite of sub-conjunctival injections of bichloride, the eye remained strongly injected and painful to pressure.

After resorption of the fibrinous exudate from the pupil, I noticed the development of fine vascular ramifications upon the anterior surface of the capsule, starting from the external borders of the pupil. This vascular plexus was composed of four larger vessels united by slender anastomoses, the whole ending in loops. Upon the iris, which was atrophied in such a way that in spots it was translucent, several dilated vessels were observed, but it was not possible to prove any connection between the vessels of the iris and those of the capsule.

The second case was that of a young man, Mathieu D—, who came to see me the 9th of June, 1893, four weeks after having been wounded in the right eye by an iron fragment, which did not, however, remain there.

I found the right eye considerably injected, cornea normal, with the exception of a cicatrix 1 millimetre long, which was lost in the interior lower portion of the corneal margin, and exhibited a little iris pigmentation at its two extremities. Anterior chamber obliterated. Iris discolored, in course of atrophy, grooved here and there by vessels: it had been torn from below inward, in such a way that the pupil was continued into a coloboma, which went up to the corneal cicatrix. The pupil, which was drawn toward the enclosure, had fairly preserved its rounded form; the angles of the coloboma were visible. The crystalline lens, already grooved by opaque striæ, showed the vitreous body, which had become of an opaque yellowish-white color. T—2, V=0. Upon the capsule of the lens

were two slender vascular ramifications, one above and one below, connecting with the iris wherever the sphincter persisted (in the pupillary field, and not in the coloboma).

The patient had left the physician who had charge of the case because he was opposed to enucleation of his eyeball. I tried sub-conjunctival injections of a bichloride solution. The first was made on the 26th of June. The next day I found that above and interiorly the iris was separated from the cornea by a little aqueous humor. This result of the injection so surprised me that I thought I must have made some mistake in my previous observation. The 3d of July a second injection was made, after which a further increase of aqueous humor was noticed. The 23d of July, a third injection: the anterior chamber was quite re-established; the eye became pale.

So far as I know, no cases have as yet been reported of reconstruction of the anterior chamber of the sub-conjunctival injections. It must be admitted that this one had been obliterated from an insufficiency of a secretion of aqueous humor. How can we explain the stimulation of this secretion by the bichloride?

The first case above described did not give me such good results from the injections, which were not efficacious, and yet there was a great analogy between the conditions of the two eyes.

Here, then, were two cases of traumatic irido-choroiditis in which vessels were developed upon the anterior surface of the capsule of the lens. In the first, I noticed the progressive formation of the vessels, and I can state that they appeared only after resorption of the fibrinous exudate. (I have several successive sketches of this eye.) In the second case, the vessels were already formed, but their appearance and eccentric position did not allow me to consider them as remains of a pupillary membrane. It must, of course, be granted that a sub-stratum is necessary to the development of these vessels, but I found no traces of any exudate deposited upon the capsule at that time, by examination with the naked eye or with the magnifying glass. In both patients the iris was atrophied, and even the pigment layer was thinned in spots. Possibly, the pigmented border which normally bounds the iris by the side of the pupil may be absent in places, thus allowing the vessels to push loops into the pupil. In my second case these vessels were attached to the iris wherever the sphincter persisted. Upon Dr. Darier's drawing (January number, p. 35) I noticed that the vessels were not inserted near a synechia; in point of fact, there is an accumulation of pigment, and this would naturally prevent a vascular new

formation. This is a mere hypothesis, which I shall, perhaps, be able to prove by microscopic examination ; it is probable that, because of persistent irritation, I shall have to enucleate the eye of Leon L.—DR. L. LEPLAT.

ITEMS

The meeting of the American Medical Association will be held at Baltimore, May 7 to 10.

The annual session of the Ophthalmological Society of Heidelberg will be held on the 5th, 6th, and 7th of August.

ANNALES D'OCULISTIQUE

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

ON DOUBLE VERTICAL STRABISMUS AND SYMMETRICAL VERTICAL DEVIATIONS OF DEGREES LESS THAN STRABISMUS

By Dr. **GEORGE T. STEVENS.**

Although vertical deviations of the eyes in concomitant strabismus have been recognized from early times, their importance and their relations to other forms of strabismus have received scant attention.

That these deviations are of great importance, and that they are often in causative relation to lateral deviations, will, I believe, become evident to one who studies the subject of strabismus from the standpoint of the physiological relations of the eye muscles, and from the results of practical experience based upon such studies.

Historical.

Boyer (1) describes not only the lateral deviations in strabismus, but vertical and oblique forms. He also describes the deviations of the squinting eye in the two latter forms as upward or downward deviations, and figures each of the forms.

In the form called by him "oblique strabismus" he advised tenotomy of the superior as well as of the internal rectus muscle. He believed that there were simple, uncomplicated cases of con-

(1) *Recherches sur l'opération du strabisme*, Paris, 1842.

verging, of diverging, and of vertical squint, and that oblique strabismus formed a distinct class.

Gradually, it became a pretty well settled doctrine that in the ordinary converging strabismus there was also a tendency of the squinting eye to rise, so that the cornea pointed upward.

Von Græfe expresses the generally accepted view of his time (1) in his article on vertical squint.

His statement differs radically from that of Boyer, for he declares that it is "*the rule that in high grades of converging strabismus there is, at the same time, a deviation upward of the cornea, so that, at its position in the inner angle, its upper part is brought under the superior lid.* Also, that when looking sidewise, so as to bring the cornea away from the angle, it sinks more and more to the horizontal diameter of the palpebral opening."

He declares that such position of the cornea is impossible through the influence of the contraction of the internal rectus alone, and that it must result from the action of either the inferior oblique or of the superior rectus.

He also points out that in such cases as he has been able to examine, in which diplopia could be recognized, the image of the squinting eye tilted with its upper end outward in proportion as the image appeared lower than the other, and that, consequently, the vertical meridian of the squinting eye must tilt with its upper extremity inward.

From these facts, he draws the conclusion that the superior rectus participates in inducing the faulty position of the eye.

Notwithstanding these facts, he regards the excessive action of the superior rectus only as *an associated action*, indicating no original excess of tension on the part of that muscle, but only as a tension necessarily combined with the excess of tension of the internus. This he proves to his own satisfaction by adducing the other fact that if the sound eye is covered the originally squinting eye assumes the position of fixation, while the other, the sound eye, not only turns in, but also drifts upward.

(1) *Archiv für Ophthalmologie*, Bd. II., opht. 2, 289, 1885.

This very important observation, misinterpreted, as we shall see, indicates the great care with which von Græfe made his examinations.

Von Græfe believed that all this tendency of the squinting eye to rise was abolished as soon as tenotomy of the internus permitted the eye to assume a position removed from the inner canthus. This last fact he regarded as the most convincing evidence that the excessive tension of the superior rectus is entirely sympathetic.

In extreme cases of upward deviation von Græfe, like Boyer, in rare instances performed tenotomy of the superior rectus after the internus had been divided (1).

Much later, the author of this paper (2) insisted that these vertical deviations were not sympathetic, but that the relation of the convergent strabismus to the vertical deviation was that of effect, and not of cause, as stated by von Græfe. The principle was advanced and emphasized that "the study of hypertropia (deviation of one visual line above the other), if not the most, is one of the most, important elements in the examination of any case of strabismus." It was held that "the unequal tension of the two pairs of superior and inferior recti is often responsible for an apparent converging or diverging strabismus, and that in many cases cures are attempted by operations on the lateral muscles which leave the cases in conditions worse than before the operations."

In a later paper (3) this principle is still further elucidated, and it is held that, "In the case of double images, whatever may be the difficulty of blending, the patient instinctively exerts his best endeavors to place the images in the same horizontal plane. It thus happens that in certain cases in which, either with or without slight lateral inequality of tension, the effort to bring images to the same plane induces a lateral squint." Attention was further called to a curious fact in con-

(1) (*Archiv für Ophthalmologie*, Bd. III., Abth. I., p. 259.

(2) STEVENS: Anomalies of the Ocular Muscles, *Archives of Ophthalmology*, 1880, No. 4.

(3) *Archives of Ophthalmology*, 1891, No. 3.

nection with the inequality of tension of the lateral muscles associated with hyperphoria, which' is, that "a condition which in a passive state of the muscles of either or of both eyes is a marked divergence becomes, as soon as all the muscles become engaged in the act of adjustment, pronounced convergence, attended by homonymous diplopia. Conversely, a like change may occur when the tendency is, in the passive state, to converge."

In these and subsequent papers I have often attempted to show, both from the physiological standpoint and from the practical results of operations performed upon the superior recti, that a large proportion of cases of lateral strabismus depend upon excessive tension of one or other of the vertically acting muscles, and that by proper relaxation of the muscles of greatest tension in this direction the lateral squint might be relieved.

Later Views of the Author.

More recently it has appeared to me that the views above expressed, while entirely correct, come short of a full comprehension of all the facts. Without doubt, the unequal tension of the vertically acting muscles may and do induce converging or diverging strabismus. But we may go further, and state that excessive tension of the corresponding vertically acting muscles of each eye may also induce lateral strabismus. In a paper read before the International Ophthalmological Congress held at Edinburgh in 1894 (1), I have called attention to the fact that there occur many instances in which both eyes deviate vertically and in the same direction, either equally or unequally, and that the excessive tension on the opposing vertically acting recti often causes the eyes to squint inward. Relief to this tension afforded to the vertically acting muscles of both eyes will also relieve the tendency to squint inward.

In a note to this article in the *New York Medical Journal* (2) it is shown that these double and more or less symmetrical

(1) The Relation of the Function of Accommodation to that of Convergence. See Proceedings of the Congress.

(2) February 16, 1895.

vertical tendencies may induce also the lesser grades of lateral deviation, esophoria, and exophoria.

This view of symmetrical deviations or deviating tendencies in the vertical direction, not the sympathetic result of inward deviation, was, so far as I am aware, an entirely new one, and it is the purpose of the present paper to call attention to some of the phenomena that may result from this condition, which has remained until so recently entirely neglected.

In order to avoid a repetition of descriptive words, I shall venture upon an enlargement of the system of terminology which I have already presented, trusting that the necessities of the case may be my excuse for introducing new terms.

The conditions which I am to discuss may be classified as :

1st. *Anotropia* ; a deviation of the visual line of either eye upward when the other eye is in fixation.

2d. *Katotropia* ; a deviation of the visual line of either eye downward when the other is in fixation.

Anotropia, Katotropia.

The simplest form of double vertical squint, that in which either eye deviates directly upward or downward when the other is in fixation, has not, I believe, been described previously to the description contained in my paper above alluded to, which was read in Edinburgh in 1894. In these cases the patient, in most instances, selects one eye for habitual fixation, while the other is permitted to diverge upward or downward. In the first instance, if, while the habitually fixing eye is directed toward an object, a visiting card is slipped between the eye and the object, the squinting eye is seen to move directly downward, while the eye behind the card rises in a line as exactly vertical as that through which the originally squinting eye descended, and to an extent approximately equal to the original squint (*Anotropia*). In several of these cases the patient has been able to exchange the fixation from one eye to the other at will. In these cases the action of the two eyes is identical with that which is shown when the card is used. If the left eye, for example, squints upward, and the patient is

directed to fix with that eye, the observer can see the eye move directly downward, while the other rises as directly.

There is in these cases usually no more consciousness of diplopia than in other cases of concomitant strabismus, and there appears to be no possibility of bringing the two eyes to fixation at the same time.

What has been said of the cases in which one eye rises while the other is in fixation applies equally to the cases in which one sinks while the other fixes (*Katotropia*).

That this condition of double deviation is not very rare will probably be discovered when attention is drawn to it, for it is probable that a considerable proportion of the cases which have been known as strabismus sursumvergens and strabismus deorsumvergens belong to this class.

A more ordinary form of double vertical strabismus is that in which, by virtue of the fact that one eye rises or is depressed to a greater extent than its fellow, a converging or diverging strabismus results. It is possible that even in cases of equal upward or downward deviation from the normal direction such secondary squints may be induced. If one recalls for a moment the peculiar anatomical features of the insertions of the four recti muscles it will be seen how easy it may be for an inward deviation to occur, if the patient insists upon forcing both eyes to the plane of fixation at the same time. The superior and inferior rectus, having their insertions mostly on the nasal side of the vertical meridian of the eye, would naturally, if a vigorous effort is made by the inferior rectus, for example, to overcome the too great action of the superiors, induce a turning in, and my recent experience with cases of alternating strabismus suggests the belief that for the most part they belong to this class in which the vertical tensions are excessive, but nearly equal.

To the other class, in which, with excessive vertical tensions, the defect is unequal, appears to belong a large class of the cases known as ordinary converging strabismus.

Furthermore, inquiry is necessary to determine how large may be the proportion of simple converging squints, but my

investigations lead me to believe that it will be found to be very small.

These very evident cases of double vertical deviation by no means constitute the whole of the anomalous cases of this class. If we assume that, the head being in the primary position, the chin neither projecting nor receding, the most correct position for the visual lines to rest when the least amount of enervation is exercised would be in the horizontal plane, then a very large number of cases find themselves in the class of such deviations as may be controlled by the individual, but only by the exercise of such continuous nervous action as to induce fatigue or nervous reaction. Indeed, some of the most serious forms of nervous reaction find their origin in this continuous effort to overcome a tendency of the visual line to rise above or to fall below the horizontal plane under the circumstances described.

These conditions may induce lateral deviating tendencies, and are often the cause of them. It is easy to see that esophoria may be induced by the increased tension of the vertically acting recti, and as a matter of fact, although it is much less easy to explain, exophoria is a frequent result of these double but somewhat unsymmetrical vertical tensions.

It will be seen from what has been stated that the plane of easiest regard should be considered in our examinations and our corrections of heterophoria. It had been my good fortune to correct some cases of esophoria and of exophoria by such carefully planned and executed relaxations of each of the superior or of the inferior recti as to bring the eyes to a plane much more favorable for the ordinary adjustments than the one originally occupied.

Indeed, we find certain cases in which a correction of esophoria or of exophoria cannot be made by relaxations of the lateral muscles short of a restriction of the rotations of the eye toward the operated muscles, which is injurious and unwarrantable. But if in these cases the too great effect of the superior recti, or of the inferior recti, as the case may be, is reduced, a full correction of the esophoria or exophoria may be made, if indeed such a correction is still required.

Even when the deviating tendency either up or down is apparently quite symmetrical, it may induce little deviating tendency in the lateral direction. The condition may, however, induce much nervous disturbance.

It is evident from what has gone before that these cases demand treatment similar to, but in some instances more radical than, the treatment applied to heterophoria.

It is rare that prisms sufficiently strong to be of very material service can be used, and tenotomy is often required. In hyperphoria or in esophoria one may operate for a very low grade of deviating tendency, but in the cases which we have under discussion an operation would scarcely be required, unless the upward or downward rotation of the eyes should be found to be materially restricted.

It remains to describe more in detail some of the effects of these anomalous conditions upon other muscular tensions, and upon the nervous and physical condition of those subject to these defects; to point out the methods employed for determining the direction and amount of these deviating tendencies, and to discuss more at length the treatment of these conditions.

(To be continued in the next number.)

THE REFRACTIVE POWER OF THE EYE AND THE AMPLITUDE OF ACCOMMODATION

By Dr. **WEISS**,

Adjunct Professor of Physics of the Faculty of Paris.

In vision at various distances, first at far points and then nearer, the refractive power of the eye increases by the act of accommodation. The maximum of this increase of the refractive power, for a given person, corresponds to what is called the amplitude of accommodation.

How may this increase be calculated?

In vision at near points the accommodation may be replaced by putting a converging lens before the eye; certain authors

consider that the strength of this lens measures the accommodation.

Let me give an example. The near point of a certain person is 10 centimetres in front of the anterior focus of his eye; he can, by placing a lens of 10 dioptries at the anterior focus, see at the near point without accommodation. It would then be said that his amplitude of accommodation was 10 dioptries.

I have supposed that the anterior focus of the eye is taken as the point of origin of measurements, as it is properly there that correcting glasses are placed.

To what does this method of evaluation correspond? Does the refractive power of the eye increase 10 dioptries in the act of accommodation? Or rather, is the system formed by the eye and the lens 10 dioptries stronger than the eye alone?

Let us see in this particular case what is the increase of the refractive power of Listing's reduced eye in the act of accommodation.

The term refractive power of a central system is generally given to the inverse of the focal distance—that is, the inverse of the distance expressed in metres of a focus from the corresponding principal plane.

In Listing's reduced eye this distance for ordinary rays of light is about 0.02m.; therefore the refractive power of the eye without accommodation is 50 dioptries.

When the eye accommodates, the image is always 0.02m. behind the principal plane, and the object is 0.115m. in front, for the anterior focus of the eye is 0.015m. in front of the principal plane. By substituting these two values in the dioptric formula we will obtain the required refractive power.

This formula is $\frac{1}{np} + \frac{1}{p'} - \frac{1}{f}$

Give n the value 1.33; we will then have

$$\text{II} = \frac{1}{f} = \frac{1}{1.33 \times 0.115} + \frac{1}{0.02}$$

or $\text{II} = 6.5 + 50$

That is to say, that to accommodate, the dioptric condition of the eye has increased 6.5 dioptries. It is seen that this increase

is by no means measured by the strength of the lens which can replace the accommodation.

But another curious fact presents itself. In calculating the refractive power of the total system formed by the eye and the lens, I have found that whatever was the strength of this lens, the total system always had the same refractive power as the eye alone. This may be easily demonstrated by a geometrical figure.

Consider a dioptric system having its principal point at S , its centre at C , and its foci at f and f_1 . Place at f_1 a lens whose focus shall be, for example, at F . It is easy to find the focus and the corresponding principal plane for the entire system. A ray XA parallel to the principal axis will take, after traversing the lens, the direction AF , then will be refracted a second time on encountering the surface of the dioptric. To find a point of the emergent ray it is sufficient to draw through the centre C a parallel to AF . The point B , where this parallel meets the focal plane, belongs to the required ray. To find its direction,

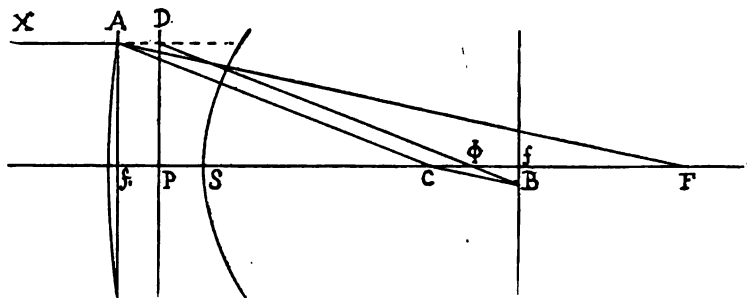


Fig. 1.

draw the line CA . The refracted ray is DB drawn through B parallel to AC ; the point ϕ , where it meets the axis, is the focus of the system; the point D where it cuts XA prolonged is in the principal plane, which is therefore DP . The focal distance of the entire system is $P\phi$. But the two equal triangles, $DP\phi$ and Af_1C , give $P\phi = f_1C$. But we know that f_1C is equal to Sf , therefore the addition of the lens before the dioptric system has not changed the focal distance, and consequently the

refractive power, of the system. The focus and the principal plane are carried forward by the same amount, $\phi f = SP$. This distance is easy to calculate, for we have:
in the similar triangles $\phi f B$ and $Cf_1 A$

$$\frac{\phi f}{Cf_1} = \frac{Bf}{Af_1}$$

but in similar triangles, BfC and $Af_1 F$, we also have

$$\frac{Bf}{Af_1} = \frac{Cf}{Ff_1} \text{ whence } \frac{\phi f}{Cf_1} = \frac{Cf}{Ff_1} \text{ and } \phi f = \frac{Cf \times Cf_1}{Ff_1}$$

Let f^2 be the focal distance of the dioptric system and F that of the lens. We then have as the required displacement

$$\phi f = \frac{f^2}{n} \times \frac{1}{F}$$

In the case of the eye, by substituting for f^2 and n their values

$$\phi f = 0.0003 \times \frac{1}{F}$$

Therefore :

When a converging lens is placed at the anterior focus of the eye, the refractive power of the system is not changed. The principal plane and the focus are simultaneously carried forward by a quantity proportional to the strength of the lens, 0.3 millim. for each dioptre.

In the particular case chosen above of a lens of 10 dioptries the displacement was 3 millimetres.

I may add that a diverging lens produces the same displacement in the inverse sense.

If the convergent lens is placed nearer the eye the refractive power increases; if it is placed further away, it diminishes. Thus the refractive power of an eye supplied with a converging glass may be inferior to that of the eye alone.

It will be seen that physiological accommodation and artificial accommodation produced by a converging glass placed before the eye are in no way to be compared; the one cannot be measured by the other.

Certain authors assume, as origin of their measurements in the eye, the optical centre of the reduced eye, calculating the accommodation by the strength of the ideal lens, which, placed in this optical centre, will replace the accommodation. This lens, placed 0.02m. behind the anterior focus, should have a focal distance greater by 0.02m. than that of the lens thus far considered—that is, 0.12m., which corresponds to 8.3 dioptries. It will immediately be seen that by this method the increase in the refractive power of the reduced eye is not measured.

In Fig. 2 I have represented three curves, giving at different ages of life the value of the amplitude of accommodation calculated by three methods which I will enumerate.

The first is Donders's curve. It gives in dioptries the strength of the converging lens which, placed before the eye at the anterior focus, will replace the accommodation.

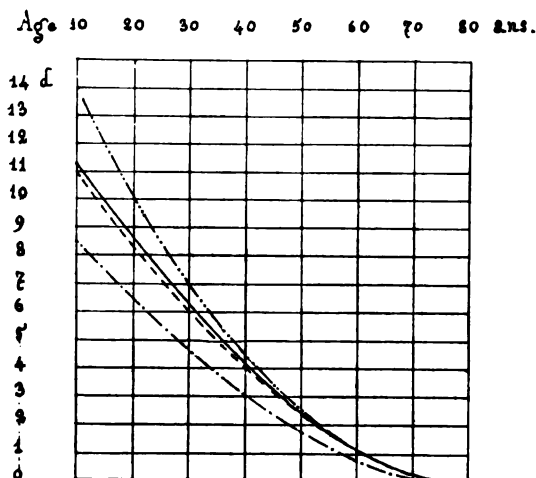


Fig. 2.

- Donders's curve.
- Power of the lens placed at the optical centre.
- Increase of refractive power of the reduced eye.
- The common curve for the power of the lens placed at the principal plane and the increase of the power of the reduced eye by the new definition.

The second corresponds to the ideal lens placed 2 centimetres behind the former—that is, at the optical centre of the eye—and producing the same effect on accommodation.

Finally, the third curve represents the increase of refractive power of the reduced eye in physiological accommodation.

It will be seen how these three curves differ from each other; inspection of the diagram is more instructive than any discussion on the possibility of replacing the third by one of the other two.

In an article which appeared recently (1) I proposed a new general definition of the refractive power of a central system which, by its adoption, removes all difficulty.

According to this definition, the refractive power of any central system is considered as *the inverse of the focal distance multiplied by the index of refraction of the last medium*.

I will not record here the considerations which led me to this conclusion, but will simply point out its principal advantage.

When two thin lenses are placed one behind the other their refractive power increases algebraically; this is a great advantage for practical calculation. But when this operation is extended to dioptric systems it will be seen that, with the former definition of refractive power, the law of addition does not hold. On the contrary, by adopting that which I have proposed, algebraic addition of the refractive powers of the lenses and the dioptric systems is made as with lenses alone. There is nothing to change in the refractive power of lenses, as the index of refraction of the last medium is unity.

Let us apply this to the refractive power of the eye and the amplitude of accommodation.

The index of refraction of the last medium is about 1.33; the refractive power of the non-accommodating eye will then be

$$50 \times 1.33 = 66.5 \text{ dioptries.}$$

As for the accommodating eye in the conditions of the example given above, its refractive power will be

$$56.5 \times 1.33 = 75.1 \text{ dioptries.}$$

There will then have been an increase in the refractive power of 8.6 dioptries. This increase is exactly measured by the ideal

(1) The refractive power of central systems. (*Revue des sciences pures et appliquées*, Dec. 30, 1894, and Congress of the French Society for the Advancement of Science.)

glass, which, placed in the principal plane of the reduced eye, will replace accommodation. This glass should be 0.015m. behind the anterior focus; it should therefore have a focal distance equal to

$$0.10 \times 0.015\text{m.} = 0.115\text{m.}; \text{ which gives } 8.7 \text{ dioptries.}$$

The difference of 0.1 dioptries comes from the neglected decimals in the arithmetical calculations.

We have then :

The strength of the ideal lens, which, placed in the principal place, will replace accommodation, measures exactly the accommodation—that is, the increase in the refractive power of the reduced eye; on the condition of assuming as general definition of refractive power the inverse of the focal distance multiplied by the index of refraction of the last medium.

I think that there is good reason for adopting this new definition, and for taking the principal plane as origin of measurements in the reduced eye, and not the optical centre, as the majority of authors have done.

I will add that the same reasons apply to the correction of myopia and hypermetropia.

DIPHThERITIC CONJUNCTIVITIS; ITS TREATMENT WITH ANTITOXINE SERUM

By Dr. V. MORAX,

Late Hospital Interne.

By the term diphtheritic conjunctivitis is meant a conjunctival affection of which the diphtheritic bacillus is the cause. If there is unanimity of opinion on the definition of the disease, there is not as yet complete accord as to its clinical characters. It does not, therefore, seem superfluous, before studying the treatment of this form of conjunctivitis, to review the precise observations, based upon bacteriological examinations, which permit us to recognize it.

Without entering upon the history of this question, let me

simply say that von Græfe, in his classical memoir, described all the forms of conjunctivitis with pseudo-membranous exudations, with the purpose of differentiating them from the purulent forms of conjunctivitis, and of showing that nitrate of silver, so useful when there is secretion from the mucous membrane, can be dangerous when this secretion is dry and infiltrated (1). The diphtheritic qualification which signifies pseudo-membranous infiltration or exudation was opposed to that of gonorrhœa—that is to say, of purulent or muco-purulent exudation. But from this somewhat confused work is retained as of most importance the existence of a grave form of pseudo-membranous conjunctivitis characterized by infiltrations, a ligneous condition of the lids, and corneal complications of rapid evolution, and for this affection was reserved the name of diphtheritic conjunctivitis. Later, from the standpoint of pathological anatomy alone, and not without protests on the part of some ophthalmologists, more clinicians than histologists, true diphtheritic conjunctivitis was distinguished from croupous conjunctivitis, placing in this class the cases of conjunctivitis with superficial pseudo-membranous exudation and benign issue. Numerous attempts based on clinical and anatomical study were made with the purpose of shedding further light on this subject, but the results were only satisfactory to the authors and this chapter of nosography, one of the most obscure, until several observers undertook to apply bacteriological analysis to the diagnosis of membranous conjunctivitis, which, in the hands of Loeffler, of Roux, of Yersin, and of Martin, had given

(1) According to von Græfe, the danger of using nitrate of silver in diphtheritic conjunctivitis should become a dogma. It does not, therefore, seem out of place to give the text of one of the conclusions of his memoir: "To give a good practical idea of the use of caustics, one should depend in every case (without stopping to consider the name of the affection) on the characteristics of the mucous membrane. If these are blennorrhœic, free applications should be employed, as this is the best and surest method of cure, even if there are extensive lesions of the cornea. If the mucous membrane is diphtheritic, cauterization is contra-indicated, and even if there is no perception of light, cauterization should not be made, as it will only bring on panophthalmitis with phthisis bulbi. If the mucous membrane presents a double blennorrhœic and diphtheritic character, cauterization should at times be made, and then suspended, according to the modifications of the local conditions."—A. VON GRÆFE: *Diphtheritic conjunctivitis and the use of caustics in acute inflammations*. (*Arch. f. Ophthalm.*, 1854, Vol. I.)

such precision to pharyngo-laryngeal diphtheria. Uhthoff describes a case of croupous conjunctivitis in which he was able to isolate a virulent diphtheritic bacillus, but the first important work is that of my colleague, Sourdille, based on the personal examination of six cases. Then came a second article by Uhthoff, and the observations of Schirmer. To-day, then, the question of diphtheritic conjunctivitis may be regarded in a scientific manner by considering those precise facts obtained from simultaneous clinical and bacteriological study and disregarding, at least for the moment, all which arises from clinical observation alone.

That which at the outset attracts the attention is, that contrary to what has been thought, ocular diphtheria seems most frequently to be a benign affection, only having a serious prognosis by reason of the diphtheritic nasal or laryngo-pharyngeal complications which may result from it (1). Indeed, the observations of Uhthoff and Schirmer relate to light cases and cases of benign development without or with insignificant corneal lesions. Only two of Sourdille's cases were accompanied with corneal infiltration and perforation of this membrane. In the five cases which I studied the affection was benign.

I should, it is true, add that some observers have attributed this benignity of ocular diphtheria to the therapeutics employed. But as the treatment of each observer differed from that of the others, it seems to me more rational, at the risk of treating lightly the opinions of my colleagues, to consider this benignity as one of the frequent characteristics of the affection.

From the clinical standpoint, diphtheritic conjunctivitis is characterized by a pseudo-membranous exudate covering the tarsal conjunctiva and only exceptionally affecting the bulbar conjunctiva. The exudate is sometimes intimately connected with the subjacent mucous membrane, so that it is separated from it with difficulty; on the other hand, at other times it simply forms a covering for the congested mucous membrane,

(1) These complications have been quite frequently noted, and the fact is very interesting as opposed to the extreme rarity of diphtheritic conjunctivitis in children with primary laryngo-pharyngeal diphtheria. In the isolated pavilion of the Children's Hospital ocular diphtheria is altogether exceptional.

and a slight rubbing suffices to dislodge it. In the language of the old school of pathological anatomy, the lesions in the first case were diphtheritic, and in the second, croupous; but we know to-day that the lesions have no specific character in themselves, that the same micro-organism may produce lesions sensibly different according to the virulence of the microbe with which it is associated, and that a disease cannot be defined by one of its lesions.

I have already stated that corneal lesions are lacking in the majority of cases. In some cases the characters were not markedly different from those usually observed in phlyctenular eruptions of the cornea, which so frequently accompany impetiginous eruptions of the face and scalp. Schirmer, however, noticed in the cases which he observed more marked and extensive corneal leucomas.

As for the lids, except a more or less marked amount of swelling, they did not present peculiar symptoms. In no case was that ligneous hardness of the lids noticed, or the impossibility of everting them to examine the tarsal conjunctiva.

In a few cases the disease left behind it small conjunctival cicatrices; as for its duration, it varied between one and three weeks.

It will be seen from this brief review that we are far from that disease which the term diphtheritic conjunctivitis has caused to be dreaded above all. What should be remembered is that it may be grave, but is generally benign.

Is it possible to make a diagnosis from the clinical symptoms of the disease? I do not think so, and my conviction is based on bacteriological examinations which have proved the complete absence of diphtheritic bacilli in cases which presented identical clinical signs with those in which plate and serum cultures revealed the presence of these micro-organisms.

Only facts relating to the existence of laryngo-pharyngeal diphtheria in the neighborhood of the patient, in the house where he lives, or, finally, the discovery of diphtheritic coryza, tonsillitis, or laryngitis in the patient himself, can suggest ocular diphtheria in a patient with pseudo-membranous conjunctivitis.

In conjunctival affections, as in pseudo-membranous laryngo-pharyngeal manifestations, a precise diagnosis may only be obtained by bacteriological examination. I should add, however, that we have a quite rigorous method of diagnosis in the use of specific treatment with serum antitoxine. The importance of a rapid diagnosis is evident, not only from the standpoint of the patient and the early application of a curative treatment, but also from the standpoint of the dangers of contagion to others.

It does not seem necessary for me to enter upon the method of procedure of bacteriological diagnosis by serum cultures. There are, however, two points to which I wish to call attention: one the utility of a microscopical examination of the conjunctival exudate, and the other the necessity of inoculating isolated diphtheritic bacilli in guinea-pigs.

In my article on the etiology of acute conjunctivitis I have already laid stress on the interest and utility of examination of fresh specimens of the conjunctival exudate, a rapid form of examination which permits precise results to be obtained in a very short time. In a certain number of cases of acute conjunctivitis the conjunctival exudate, examined under the microscope, only contains the species of microbe which is the etiological cause of the inflammation, and these micro-organisms (*gonococcus*, *bacillus* of acute contagious conjunctivitis) are those which develop poorly, or not at all, under the usual conditions of a culture. If, then, the examination of fresh specimens is neglected, and the diphtheritic bacillus develops in the serum culture, one would be inclined to think that it alone was the cause of the trouble, while in reality it only took part in the pathological process in virtue of the lesions primarily caused by the *gonococcus*, the *bacillus* of Wecks, or some other such microbe. Furthermore, in pronounced cases of ocular diphtheria extemporaneous examination of fresh specimens has shown diphtheritic bacilli so abundant and characteristic that I have been able immediately to affirm the diphtheritic nature of the disease.

When the coagulated serum culture has produced, after remaining from twelve to twenty-four hours in the oven, a development of grayish, projecting colonies, formed by bacilli of irregular form which take Gram's stain, one is not yet author-

ized to state that they are diphtheritic bacilli. There may be strong presumption if the colonies are very numerous, but it is necessary in all cases to make beef-tea cultivations of isolated bacilli for inoculation in the sub-cutaneous connective tissue of guinea-pigs. Inoculation alone, which demonstrates the virulence of the micro-organism, permits a differentiation to be made between the diphtheritic and the pseudo-diphtheritic bacillus so common on the conjunctiva. It is known that the differentiation between these two microbes is based especially on the factor of virulence, and that it has always been impossible to produce, experimentally, virulent symptoms from pseudo-diphtheritic bacilli, while it is possible to so attenuate a diphtheritic bacillus that it becomes inoffensive. In ocular diphtheria the diphtheritic infection appears always to be secondary. This is a fact to which certain clinicians have already drawn attention, and which Uhthoff and Sourdille noticed in their observations: it may be measles, blepharitis, phlyctenular conjunctivitis, or acute conjunctivitis which forms the primary affection on which the diphtheritic bacillus grafts itself. It is asked if, under the influence of the microbes which determine the primary affection, the inoffensive diphtheritic bacillus may become virulent. Up to the present time no experience authorizes this supposition, and if clinical analysis is relied upon it will be found that contagion is noted in numerous cases, and that there are only a small number of cases in which it was possible to find in the neighborhood of the patient a clear case of laryngo-pharyngeal or ocular diphtheria.

Uhthoff and Fraenkel have in several cases found virulent diphtheritic bacilli in the healthy conjunctiva, and they have thought that this discovery is of a nature to destroy the precision of bacteriological diagnosis. I have examined the conjunctival cul-de-sacs of quite a large number of cases, both in healthy persons and in the course of various ocular affections, without ever finding virulent diphtheritic bacilli. It is true that my examinations were not made on hospital patients, and it is quite possible that in making further researches a virulent diphtheritic bacillus might be found in certain persons at a given time; but what I wish to call attention to is that in diph-

theritic conjunctivitis there are only one or two colonies of virulent bacilli found, but that in the cultures the colonies are in relatively greater numbers, that the bacillus may be found in the exudate on microscopical examination, and that therefore there can be no doubt as to the rôle played by it in these lesions.

There is finally one point which it seems proper for me to mention. Sourdille in his article considers that the gravity of ocular diphtheria depends on the virulence of the diphtheritic bacillus and on the character of the associated microbes; the association of the streptococcus will more especially determine the severe forms. Thus presented, this proposition does not seem quite exact to me, and Uhthoff has already noticed that in three cases of benign diphtheritic conjunctivitis (croupous form), the bacillus of Loeffler was associated with the streptococcus and the staphylococcus. I have found the same thing, and it seems to me rather that the gravity depends on the lesions caused by the primary infection, which becomes complicated with the diphtheritic bacillus. Suppose, for example, that instead of being limited to the conjunctiva, the phlyctenular eruption which so frequently accompanies impetiginous lesions of children's faces developed at the same time on the cornea; if the diphtheritic bacillus appeared, the disease, benign in the first case, could become very grave in the second, and yet in both cases the streptococcus would be found. In ocular diphtheria it is, in fact, the corneal lesions which determine the prognosis.

I will now describe four cases of diphtheritic conjunctivitis which I have studied, and which were treated with serum antitoxine.

Conjunctival, Nasal, and Laryngeal Diphtheria Following Measles; Tracheotomy; Treatment with Serum; Recovery.

Case I.—Lad—, René, six and a half years old, was received on February 24, 1894, in the isolated diphtheria ward of the Children's Hospital. Eight days before his entrance in the hospital the child had been attacked with measles and had had conjunctivitis and coryza.

On February 24 there was found quite a marked swelling of the tonsils without false membranes. There was no cough, and decided difficulty in breathing necessitated immediate tracheotomy. The operation was performed the same day at 11 o'clock in the evening.

On the day before some disturbance of the conjunctiva had been found. On February 25 there was a pseudo-membranous exudate on the tarsal conjunctivæ of both sides. Drs. Roux and Martin asked me to examine the conjunctival lesions, and I made the following notes :

The lids of both eyes were somewhat swollen and thickened without induration. At the internal angle was found a scanty secretion, a little more marked in the right than in the left eye, which had caused a slight erythema of the corresponding region. The bulbar conjunctiva was somewhat injected, but the cornea of both eyes was healthy. On everting the lids, which was easily done, there was found on the tarsal conjunctiva a yellowish-white false membrane, thick, fatty in appearance, and adherent to the subjacent mucous membrane. This could not be raised up without causing the mucous membrane to bleed. There was no engorgement of the pre-auricular ganglion.

On February 24 the first injection of 30 c. c. of antitoxine serum was made, and a collyrium of nitrate of silver $\frac{1}{10}$ was instilled in each eye. February 26, the general condition was not decidedly modified. There was, however, a certain improvement of the tarsal conjunctiva. A second injection of 20 c. c. of serum and a second instillation of nitrate of silver was made. February 27, the improvement of the pseudo-membranous conjunctivitis was quite marked. The false membrane which formed a uniform layer was now limited at several points. Another injection of 15 c. c. was deemed necessary from the general condition, which was still bad. March 1, the swelling of the lids had completely disappeared. On the right side only, on the tarsal conjunctiva of the lower lid, a small whitish spot was found. The cornæ were intact. The conjunctival injection and secretion were very slight. March 3, the recovery of the ocular lesions was complete.

I will not dwell upon the later pulmonary complications (broncho-pneumonia) presented by the patient, which nevertheless resulted in complete recovery.

Bacteriological Examination.—Cultures of the false laryngeal membranes, made by Dr. Martin, proved the existence of long and large diphtheritic bacilli associated with a coccus. An injection of 1 c. c. of a twenty-four-hour beef-tea culture of this diphtheritic bacillus killed a guinea-pig in eighteen hours with the characteristic lesions.

February 25, we made three serum cultures with the product of the scrapings of the false conjunctival membranes. In twenty-four hours abundant colonies of diphtheritic bacilli developed. No other

micro-organism developed. One c. c. of a twenty-four-hour beef-tea culture injected under the skin of a guinea-pig killed the animal in three days with sub-cutaneous oedema, pleural effusion, and congestion of the supra-renal capsules.

March 1, two new cultures were made. On the next day only four or five diphtheritic colonies had developed in each tube. There were, however, other colonies formed by a coccus. Inoculation of 3 c. c. of a twenty-four-hour beef-tea culture killed a guinea-pig in twenty-four hours.

Monocular Conjunctival and Palpebral Diphtheria ; Injection of 10 c. c. of Serum ; Recovery.

Case II.—M. Coud, thirteen months old, was brought to Dr. Parinaud's clinic on January 8, 1895. The mother told me that the patient's sister had been sick five weeks before with scarlatina complicated with diphtheritic tonsillitis and laryngitis, and had been treated with serum at the isolated ward of the Children's Hospital. This child had left the hospital three weeks after her entrance, and was now very well.

My little patient already had an impetiginous eruption at the root of the ear and on the scalp when his sister returned from the hospital. About the 3d of January the upper lid of the left eye became the seat of an analogous lesion to that which existed behind the ear. A short time after, the lids became swollen and remained closed. To these lesions were added a slight fever and loss of appetite, which decided the mother to seek advice.

On January 8 I found the following symptoms: The child was pale, prostrated, and cried continually. The eyes were firmly closed. On the lids of the left eye was a thick, brownish crust, easily removed, and leaving behind it a bleeding ulcerated surface. On everting the lids, which was done without difficulty, the tarsal conjunctiva appeared covered with a grayish, fatty, pseudo-membranous exudate, adherent to the subjacent mucous membrane, which bled when an attempt was made to remove it. The bulbar conjunctiva was somewhat injected, but there was no false membrane. The cornea was intact. The conjunctival secretion was very slight. The pre-auricular ganglion on the left side was somewhat increased in size. The right eye was slightly injected, but the conjunctiva showed no trace of a false membrane.

On and about the left eye was a region of impetigo. There were no pharyngeal or laryngeal disturbances. From the history a diagnosis of diphtheritic conjunctivitis was made, and until the next day

applications of boracic acid compresses were prescribed to remove the crusts.

On January 9 the crusts on the lids only reappeared at a few points. In other parts the ulcerated skin was covered with a grayish false membrane having the appearance of cutaneous diphtheria. On the forehead were two small impetiginous plaques without false membranes. The lids were no more swollen than the day before, and were not hard or infiltrated. The tarsal conjunctiva was covered with a grayish exudate limited by the borders of the lids. The bulbar conjunctiva was slightly injected, and presented at the nasal side one or two spots covered with small limited pseudo-membranous exudates. The cornea was intact. In the right eye was a mild conjunctival catarrh without false membrane.

Bacteriological examination made the day before confirmed the diagnosis of diphtheria, and an injection of 10 c. c. of Roux's anti-toxine serum was made.

January 10.—The mother found some improvement in the general condition. The child was less prostrated, and had partly opened the lids. The cutaneous lesions looked better. Changes in the conjunctiva were less apparent at first. It was noticed, however, that the borders of the false membrane were more easily raised and showed a tendency to spontaneous detachment. There were no corneal lesions.

January 11.—Improvement was more evident. The child was less prostrated. The cutaneous lesions only showed an ulcerated surface without false membrane. With the exception of one or two spots of 1 to 2 millimetres in extent the tarsal conjunctiva was no longer covered with a pseudo-membranous exudate. The lids of the left eye were open. The corneæ showed no trace of disturbance.

January 12.—The conjunctiva was completely clean.

On the following days cicatrization of the cutaneous lesions was rapidly effected. I saw the patient again on January 19. The palpebral lesions were almost completely cicatrized, and the conjunctiva no longer showed any traces of the former disease.

Bacteriological Examination.—On January 8 a fresh specimen of the false membrane was examined. Under the microscope were found chains of cocci, and in some leucocytes clusters of cocci. Between the leucocytes were also seen, but in smaller numbers, quite long diphtheritic bacilli.

Three tubes of serum were fertilized with the false conjunctival membrane, and one tube with the false cutaneous membrane. In all the tubes there developed in twenty-four hours colonies of diph-

theritic bacilli, a smaller number of yellow colonies of aureus, and a few scattered colonies of streptococcus.

A gelatine culture made from the false conjunctival membrane showed on the following day numerous colonies of streptococci and a few of aurei.

The isolated diphtheritic bacilli were injected in the dose of 1 c. c. of a twenty-four-hour beef-tea culture under the skin of a guinea-pig weighing 500 grammes. The animal died in forty-eight hours with a marked œdema at the point of inoculation, a slight serous effusion in the pleura, and congestion of the supra-renal capsules.

Conjunctival and Nasal Diphtheria; Injection of 20 c. c. of Serum; Recovery.

Case III.—Marius, thirteen months old, was brought to Dr. Parinaud's clinic on February 26, 1895, for an ocular trouble, which had commenced one week before, and which for three days had been much aggravated.

The child, always well, was strong and well developed. The only antecedent history was an attack of laryngitis stridulus in December, 1894. Eight days before there had appeared on the scalp and in the retro-auricular fold a quite distinct impetiginous eruption. About the same time the mother had noticed that the lids were glued together on awaking, and that there was some lachrymation. The conjunctival secretion was very slight. The ocular affection was accompanied with some photophobia, but the child did not complain, and the mother attached no great importance to it.

A few days after the commencement the disease suddenly assumed a more serious aspect. On February 23 it was noticed that the lids of both eyes were swollen, and that the child only opened the eyes with difficulty. Its general condition was altered; it was feverish and restless. February 25, the palpebral swelling had increased and the lids remained closed. A large quantity of clear mucus flowed from the nostrils, and several fits of coughing were added to the other symptoms.

On February 26, when the patient was brought to me, the lids of both eyes formed large œdematous pads; the lids, however, were supple, and it was easy to evert them. There was found in the entire extent of the tarsal mucous membrane a pseudo-membranous exudation of grayish-white color, more or less œdematous in portions, and which it was impossible to detach from the mucous membrane. The cul-de-sacs, also, were covered with the same exudate. The bulbar conjunctiva was injected and slightly chemotic. Both

corneæ were intact. A large amount of clear fluid escaped, which did not settle on the lids.

The pre-auricular and sub-maxillary ganglions were not hypertrophied. The nasal mucous membrane about the nostrils was covered with a uniform whitish exudate. The pharynx showed no pseudo-membranous lesions.

This was, therefore, a case of conjunctivitis with pseudo-membranous coryza. I immediately made an injection of 10 c. c. of Roux's serum under the skin of the abdomen and prescribed simple lotions of hot water.

February 27.—The child had had a calmer night than the preceding, and in the morning was gayer and opened the lids spontaneously.

Their swelling had not sensibly diminished, but on everting the lids the false membranes were seen to be exfoliated in large surfaces, and they were removed from the entire conjunctival surface by gentle rubbing with a tampon of cotton. The false membranes were less œdematous and more opaque. The subjacent tarsal conjunctiva was less œdematous.

The flow of mucous from the nose had been much less abundant. There was, in fact, a notable improvement, which the child's mother was the first to notice.

February 28.—The improvement found the day before did not persist, and the condition was the same as on the first day, before the injection of serum. The false membranes were again adherent, the child was restless and moaned considerably. The night had been a bad one.

The corneæ were intact, but the palpebral swelling was not modified. The child had not opened its eyes since the day before.

Another injection of 5 c. c. of Roux's serum was made. No other treatment was employed.

March 1.—The night had been a quiet one. On waking in the morning, the child had opened the lids. The false membranes were no longer adherent to the subjacent mucous membrane, which was much congested. A current of water removed them completely. The corneæ were intact, and the swelling of the bulbar conjunctiva was much diminished.

A third injection of 5 c. c. of serum.

March 2.—The child had slept very well. It had recovered its gayety, and since morning the eyes were wide-opened. The palpebral œdema was scarcely noticeable. Only a very thin pseudo-membranous exudate remained on the tarsal conjunctiva of the lower lid, which was removed with a fine jet of water. The corneæ were intact and showed no trace of disturbance. The mother had noticed that

several false membranes had escaped from the nostrils. The general condition was excellent.

March 3.—No more traces of false membranes. The conjunctivæ were slightly injected, but there was no secretion, and the palpebral œdema had disappeared.

March 7.—Everything had regained its former condition. There was only found in the lower left conjunctival cul-de-sac a limited surface, smoother and whiter than the rest of the mucous membrane, which seemed to be a superficial cicatrix.

Bacteriological Examination.—Examination of fresh specimens of pseudo-membranous exudate revealed numerous bacilli, quite long, and of irregular form, which were colored with Gram's stain. Some were free, and others were enclosed in leucocytes. With the exception of this bacillus, only a small number of diplococci were seen.

Three tubes of serum fertilized on February 26 showed on the next day numerous typical colonies of diphtheritic bacilli. In the first two only there were, besides, several small grayish colonies. In a gelatine culture the colonies of streptococci were more numerous, while the diphtheritic colonies were few in number.

Isolated diphtheritic bacilli transferred to beef-tea produced there a fine deposit on the sides of the glass: 1 c. c. of a twenty-four-hour culture, inoculated under the skin of a guinea-pig, killed it in two days, with œdema at the point of injection, pleural effusion, and congestion of the supra-renal capsule.

The isolated streptococcus produced a flocculent deposit in the beef-tea; 1 c. c. of this culture injected into the cellular tissue of the ear of a rabbit produced the next day a slight swelling and diffuse redness of the ear, but these disturbances diminished on the second day, and there was no trace of them on the fourth.

On February 28 examination of fresh specimens and of serum culture proved the presence of diphtheritic bacilli in abundance.

On March 1 I made a serum culture of the conjunctival mucus of the patient's mother. The result was negative in reference to the presence of diphtheritic bacilli.

On March 7 I made a serum culture of the child's conjunctival mucus, but no diphtheritic colonies developed.

From an etiological point of view investigations were of no avail in regard to this case of ocular diphtheria. The parents had moved into a new lodging, obscure and damp, on February 18, 1895, and they do not know whether there had previously been a case of diphtheria in the house. The ocular trouble had commenced at the time they occupied their new domicile.

Conjunctival and Nasal Diphtheria ; Injection of 10 c. c. of Serum ; Recovery.

Case. IV.—Bri——, Emile, ten months old, was brought to Dr. Parinaud's clinic on March 23, 1895. The child had been suffering for fifteen days ; it had had coryza and bronchitis, and had not left its room during that period.

On March 15 the mother had noticed that the child kept the right eye half closed ; she had noticed no secretion nor lachrymation, but her information lacked precision.

On March 18 the condition of the eye was worse, and the left eye was attacked. The lids were not much swollen, and the child still opened them.

On March 22, on waking, the lids were cedematous, and the child could no longer open them.

The mother at last decided to consult a physician, and on March 23 I saw the patient for the first time.

The child was well developed, and aside from a few variole cicatrices, showed no traces of former disease, either hereditary or acquired.

The eyes were hidden by the swollen lids, which formed large cedematous pads on both sides. The border only of the lids was slightly injected. The lids, however, were supple and easily everted. There was no purulent secretion, and no flow of tears on the outer surface of the lids. The tarsal conjunctiva and the cul-de-sacs were uniformly covered with a gray false membrane, slightly adherent to the subjacent mucous membrane, from which it was separated with very slight bleeding. The bulbar conjunctiva was slightly chemotic, but the corneæ were intact. The pre-auricular and sub-maxillary ganglia were a little increased in size.

There was an abundant muco-purulent discharge from the nostrils, and a white pseudo-membranous exudate was found on the pituitary membrane. No disturbance was found in the pharynx. The mother had noticed that during the last few days the child had been restless and feverish.

I was not able to obtain any precise etiological information.

The parents lived in a house occupied by a number of working people, but there was no diphtheria among them.

On the same day an injection of 10 c.c. of Roux's serum was made in the side. The sister of the patient, two years old, was given an injection of 5 c. c. as a precautionary measure. For local treatment, a boracic acid solution was prescribed.

March 22.—The patient was calmer during the night, and sleep had not been interrupted. On waking, the swelling of the lids had con-

siderably diminished, and the child opened the eyes. The conjunctival false membranes were thinner, and easily removed by simple rubbing.

March 25.—The œdema of the lids had completely disappeared. The tarsal conjunctiva was still slightly injected. In the cul-de-sacs only was still a very thin pseudo-membranous exudate.

March 26.—The conjunctivæ and the pituitary membrane were perfectly clean, but there was still an abundant muco-purulent discharge from the nostrils.

March 28.—The conjunctivæ were quite normal in appearance. There were no cicatrices.

Bacteriological Examination.—On March 23 microscopical examination of the false membrane showed the presence of encapsulated diplococci in large numbers, and of bacilli of various irregular sizes scattered between the leucocytes.

Bacilli and diplococci were colored with Gram's stain.

Three serum cultures produced in twenty-four hours many colonies of diphtheritic bacilli. No other species of microbes were developed.

A gelatine culture produced in twenty-four hours numerous small translucent colonies composed of diplococci and chain cocci surrounded by a distinct capsule. Beside the colonies there were also small colonies of diphtheritic bacilli and three white colonies formed of a large coccus. Injection of the diplococci in a mouse killed it in forty-eight hours. Its blood contained encapsulated diplococci, which in beef-tea and gelatine cultures produced colonies with all the characteristics of pneumococci.

The diphtheritic bacilli, transferred to beef-tea, produced a slight cloud and a granular deposit.

One centimetre of this culture injected under the skin of a guinea-pig 400 grammes in weight killed it in six days.

Examination of fresh specimens, as in the cultures, showed the simultaneous presence of diphtheritic bacilli and pneumococci in the pseudo-membranous exudate.

On March 25 a second microscopic examination of the secretion did not reveal the presence of diphtheritic bacilli. A serum culture, after twenty-four hours in the oven, only produced two diphtheritic colonies.

On March 27 a tube of serum was fertilized with a platinum wire which had been drawn through the conjunctival cul-de-sac. In twenty-four hours no diphtheritic colony appeared.

A serum culture of the conjunctival mucus of the child's mother, made on March 23, produced no development of diphtheritic colonies.

Passing over the interesting clinical, etiological, and bacteriological points presented by these four cases let us consider the therapeutics.

In three cases injection of the serum caused rapid and complete recovery. The disease was not followed by corneal disturbances. This is in perfect accord with the five cases already published (1).

I have shown at the commencement of this memoir that diphtheritic conjunctivitis is very frequently benign. The objection might, therefore, be made that recovery in these cases was not due to the injection of serum, and that the disease might as well have recovered spontaneously. It is evident that I can make no such presumption; but the rapidity of recovery and the changes in the local and general condition following the injection so closely, show conclusively the therapeutic activity of the serum. From the facility with which the lesions were followed, these cases of ocular diphtheria furnish the best demonstrations.

Consider cases II. and IV.: From the day after the injection the lids, which had been firmly closed, were opened, and the adherent false membranes were easily detached with the slightest touch without causing the subjacent mucous membrane to bleed. On the next day, the conjunctiva was still injected, but the pseudo-membranous exudates had almost entirely disappeared. On the fourth day recovery was complete. The dose injected had been 10 c. c.

This quantity may be insufficient, as is shown by my third case. It is true that in this case the ocular diphtheria was complicated with nasal diphtheria. The first injection of 10 c. c. produced an improvement on the first day, followed by a relapse; but a second injection was sufficient to cause the disappearance of the false membranes in forty-eight hours.

The dose injected in the first patient was very large. The child had diphtheritic conjunctivitis, rhinitis, and laryngitis complicating measles; it must not be forgotten that this case

(1) COPPEZ. (*Annales d'Oculistique*, November, 1894, and January, 1895.)

D. DESSEAUX. (*Normandie Medicale*, January, 1895.)

JESSOP: Communication to the Ophthalmological Society of London, session of January 31. (*Annales d'Oculistique*, February, 1895.)

was treated at the beginning of sero-therapeutics (February, 1894), and that at that time the therapeutic action of serum was not yet established. It was also for this reason that cauterization with $\frac{1}{40}$ collyrium was prescribed. The diphtheritic conjunctivitis disappeared in three days.

In cases where the diphtheria is localized on the conjunctiva an injection of 10 c. c. seems to be sufficient, but if the false membranes extend to the pituitary membrane and the pharynx, it will be better to increase the injection to 20 c. c. This injection is best made under the skin of the abdomen. As for local treatment, lotions of hot water or boracic acid are sufficient.

The last three patients remained with their families during the whole period of the disease; I injected 5 c. c. of serum in their brothers or sisters, as a preventive measure. They suffered no disturbances of any kind from the injections.

What course should the physician pursue in the presence of a case of pseudo-membranous conjunctivitis?

I think that in the absence of a bacteriological examination he may in all cases, and without danger, make an injection of serum. But that is not sufficient if the case is doubtful—if, besides the pseudo-membranous exudation, there is a more or less abundant purulent secretion. It should not be forgotten that certain cases of acute conjunctivitis may, especially during the first days, be mistaken for diphtheritic conjunctivitis. The fear of nitrate of silver (in collyrium) in ocular diphtheria has certainly had more harmful consequences than its use in this disease could ever have produced. I have seen cases of gonorrhoeal conjunctivitis where there was a pseudo-membranous exudation which was mistaken for ocular diphtheria, which latter did not exist. Cauterization with nitrate of silver was carefully avoided, but this prudence was none the less followed by extensive lesions of the cornea.

I recently observed at Dr. Parinaud's clinic a case of acute contagious conjunctivitis in a child. A superficial false membrane had developed on only one side, which was not adherent to the tarsal conjunctiva. Cauterizations with nitrate of silver $\frac{1}{40}$ were prescribed without considering the false membrane

otherwise than for bacteriological examination. Complete recovery followed in a few days, and the false membrane disappeared in the same time. Bacteriological examination showed, however, that besides the bacillus of Weeks, there was a virulent diphtheritic bacillus. During the period of treatment, the mother took the disease, but she had an acute contagious conjunctivitis of moderate intensity without diphtheritic complications. In the house inhabited by these patients there had been, six months before, a case of laryngo-pharyngeal diphtheria. Here is then a case of ocular diphtheria confirmed by bacteriological examination, in which cauterization with collyrium of nitrate of silver produced (or at least did not prevent) a rapid recovery.

It will also be seen in the first case in this article that collyrium of nitrate of silver did not change the action of the anti-diphtheritic serum.

I think that in case of doubt, if there are false membranes and a purulent secretion, and if the diagnosis of ocular diphtheria is not firmly established, it will be well, after making an injection of serum, to cauterize with collyrium of nitrate of silver. If there is no secretion, or if it consists only in flow of tears, and if from the history, or rather from bacteriological examination, a diagnosis of ocular diphtheria is made, injection of serum without other local treatment is enough to bring about recovery.

CLINICAL STUDY ON ARTIFICIAL EYES

By Dr. **PANSIER** (of Avignon).

Introduction and Extraction of the Artificial Eye.

Before introducing an artificial eye the orbit should be cleansed with a solution of boracic acid. The first few times it would be well to instil, as a preparation, a few drops of cocaine.

The eye should be moistened before being introduced into the orbit.

In the case of a right eye, the eye is held between the thumb and index finger of the right hand. With the thumb of the

left hand the upper lid is lifted and the large extremity of the eye is introduced, allowing it to slide along the cheek and lower lid. The eye is pushed upward and inward in a way which lets it slide between the stump and the lid. Little by little it is brought to a horizontal position. The upper lid is then allowed to drop, and the eye is held in place by the thumb and index finger of the left hand. With a finger of the right hand the lower lid is drawn down in such a way as to make an ectropion, the eye is carefully forced into the orbit and supported by the fingers which hold it, so that it becomes lodged in the lower cul-de-sac. The lower lid is then released, which, on recovering its position, holds the eye in place.

For the left side, the artificial eye is held in the left hand and the upper eyelid is lifted with the right.

If the patient himself performs this manipulation he uses the left hand where we have indicated the right.

To remove the eye, the lower lid is drawn forcibly downward, making a complete ectropion.

The patient is made to look up, and the eye falls into the hand ready to receive it.

If there is no stump, or if for any other cause this process does not succeed, the head of a pin may be introduced under the lower edge, near the internal angle. The pin is carried from inward outward, and generally, before it reaches the middle of the lid the eye slides out of the orbit.

Rittérich points out a third method by which large and more rebellious eyes are removed. A small hook (for example, a hairpin bent at the curved end) is introduced under the lower edge of the eye from inward outward toward the middle. While a slight traction is made on the eye, the upper lid is pressed toward the external angle with the thumb, and toward the internal angle with the index. In this way the lid, pressed against the orbit, prevents the eye from sliding, while the hook draws it toward the interior angle, or it is held between the thumb and index finger.

A process which is frequently employed by the patient is as follows: the lower lid is drawn down, the thumb-nail is inserted

between the lower edge of the eye and the conjunctiva, and the eye is taken between the thumb-nail and the end of the index finger.

Another method consists in drawing the lid downward, then pressing upon it in such a way that it passes under the lower border of the eye, which then slides spontaneously out of the orbit. This procedure is only practicable when the eye is not very prominent.

It is never well to employ forceps for removing an artificial eye. For example, if one attempts to grasp an eye with forceps he must press them so tightly as to incur the risk of breaking the eye.

For children who wear an artificial eye for the first time, Boissonneau has suggested making a hole in the lower border of the eye, through which a thread is passed. This thread lies on the cheek and serves to remove the eye.

This process seems to me little to be recommended; the thread on the cheek would be annoying, and would expose the child to the temptation of removing the eye too frequently from the orbit. I know that Rittérich, to overcome this difficulty, recommends that the thread be fastened to the cheek by a small plaster. This method would, I believe, be scarcely accepted.

Before giving an artificial eye to a patient the practitioner should assure himself that the patient understands putting it in, and especially the taking it out. It is frequently tiresome to give this instruction, but it is indispensable. However, I have never found much difficulty in teaching this manoeuvre to my patients, even when they happened to be children. These latter learn this exercise with such rapidity that they abuse their talent at the risk and peril of the artificial eye.

In the beginning the patient should be recommended to wear the eye only during certain hours, in order to gradually accustom the orbit.

Rittérich considers this restriction unnecessary: "A well-made and well-fitting eye causes no pain or inconvenience, and may be worn a half-day or more."

This may be in the majority of cases; but I think it better to

leave a large latitude to the patient, after being assured that the stump is not sensitive to pressure.

It is generally said that the artificial eye should be removed at night, in order that the orbit may rest. I know patients who have worn artificial eyes during many years, and who never take them out day or night, except for a short time each morning, when the eye is polished and the orbit cleansed.

The eyes, under these conditions, of course, wear out much more rapidly. We are not warranted in prescribing the continued use of the artificial eye.

Excesses of this nature may prove to be the cause of sympathetic troubles: "I removed an artificial eye for a woman which she had allowed to remain in the orbit for three years, the optician having omitted to inform her that the eye should be removed from time to time. Lustreless, rugose, and covered on the posterior side with calcareous concretions, the eye had become the cause of inflammatory disorders." (Deval: *Traité des maladies des yeux*, p. 1036.)

The patient should be advised to remove the eye at least once a day, to polish it, and to cleanse the orbit either with clear water or a solution of boracic acid.

Durability of an Artificial Eye; When Should It Be Changed?

Enamel, like glass, undergoes a chemical change on contact with the air, especially moist air; also, in the orbit, under the action of tears, the mucus of the conjunctiva, and under the influence of the lids, the eyes rapidly lose their lustre, and become dull and roughened.

The method of putting the eye in a glass of tepid water and leaving it overnight is, therefore, a bad one, from the point of view of its preservation.

"Artificial eyes," says Rittérich, "last at least two years or more." When an artificial eye has become roughened it may be polished by rubbing it with a piece of linen coated with modelling wax impregnated with fine-powdered emery. "By this means," adds Rittérich, "I have known a man to

wear the same eye for ten years, only taking the precaution to polish it as soon as the eye appeared to become roughened."

The artificial eye should be changed, either because it does not fit the orbit, because the eye is badly made, or because it is worn out.

The most striking sign which indicates to us the necessity of changing the eye is the absence of mobility. If the movements of the eye compared to those of the stump are less extended, it is because the eye is too large or too small. If too large, it is compressed in the orbit by the eyelids and cannot follow the impulsion given by the stump; if too small, it becomes loosened from the stump, does not receive the movements from it, and may become spontaneously displaced from the orbit.

A fault still more grave is the loss of stability. The eye falls spontaneously, or comes out at the least movement.

The loss of stability may proceed from several causes: from a fault in the eye, or an anomaly in the orbit.

1st. From the eye itself. The eye is held in place by the eyelids, especially by the lower lid, against which it rests. If the eye is too bulky, the lower lid is pressed down, the cul-de-sac disappears, and nothing remains below to hold the eye, which is carried out of its proper position by the pressure of the upper lid. If the eye is too small and its upper conjunctiva too narrow, in its movements it rises into the upper cul-de-sac so far that its inferior border becomes disengaged from the lower cul-de-sac, and the eye escapes from the orbit.

2d. The fault in stability may proceed from the orbital cavity. A shrinking of the lower cul-de-sac or a conjunctival bridle prevents the eye from being held in its place.

A defective artificial eye may cause more or less violent pain. If it is too large, it takes possession of the entire orbit. If a single point bruises the conjunctiva, the pain will be localized at this point, and especially in movements which press the eye toward the seat of the pain.

On the other hand, the eye being too strongly convex, the pressure of the edge of the eye will be too strong upon the

stump, and the latter will be wounded. The pain then becomes generalized and increases at every movement of the eye.

An opposite effect may follow if the eye is not sufficiently arched and the posterior face rests against the cornea or the cicatrix of the stump. The pain, localized at first in the stump, soon takes the form of insupportable headaches.

Pain appearing on the in and out movements of the eye indicates that the internal border bruises the lachrymal caruncle.

A lustreless and worn-out eye causes itching, and a feeling like sand in the eye; this pain may cause the most intense headache.

Dangers Arising from a Defective Artificial Eye.

If the artificial eye is an advantage, either from a functional point of view, in providing a more easy outlet for the tears, or from a cosmetic and æsthetic point of view, in hiding an unpleasant deformity, it demands some care and precaution on the part of the practitioner. That is to say, a well-made artificial eye is generally without danger, but a defective eye may lead to the gravest results. Especially in the country, in the absence of competent oculists, it is the pharmacists and opticians who have charge of artificial eyes, and who discharge this duty as well as their limited knowledge or their ignorance of the question allows—that is to say, generally as badly as possible. They choose from a collection more or less restricted an eye which they force, at a venture, into the orbit, without regard to size or the presence of cicatricial bridles. The fault of these eyes is nearly always that they are too large.

That is why, therefore, the artificial eye is frequently unable to entirely hide the loss of the organ.

In many cases of enucleation, notwithstanding the presence of the artificial eye, there exists under the eyebrow an unpleasant depression caused by the position of the lid. The elevator muscle is inserted into the tarsal cartilage by a layer situated between it and the orbicularis muscle (Schwalbe). The levator muscle then reflected upon the globe serves as a point of support which acts upon the lid. If the globe is absent, this point of support for the muscle is wanting, and the muscle then acts

directly backward. This form of action brings about a marked falling in of the lid below the brow. The presence of the artificial eye, especially when the orbital borders are very prominent, does not fully correct this defect, and leaves a conspicuous hollow.

In order to remedy this, one is tempted to augment the size of the eye; indeed, the larger it is the less apparent is this depression. With very large eyes it is rendered but little noticeable, but at the price of serious mischief.

I have seen some striking examples which I think worth reporting.

A young woman came to me to have her eye, which was slightly roughened, changed. The lower lid of this eye was pulled down, forming a slight ectropion: the patient stated that the eye watered constantly. It was completely immovable. I removed it; it was very large, much larger than the globe for which it had been substituted, and instead of forming an ellipsoïde, it constituted at least three-quarters of a complete sphere. I showed the patient that if she persisted in wearing so large an eye she exposed herself to grave dangers: the laxness of the lower lid was very marked, it could increase to a point where it would completely efface the cul-de-sac, and the eye would lose its stability. I advised her to rest several days without using the eye, in order to permit the lower lid to regain a little tone, and absolutely refused even to give her a smaller eye. She returned about one month later, having continued to wear the eye. For several days she had severe periorbital pain, especially during the day, and presented on the opposite side sympathetic ophthalmia. The removal of the eye stopped all pain, but for many months the patient could not endure even a small eye. The sympathetic visual troubles became rapidly better.

In another case, the patient, a robust peasant, abandoned the use of the artificial eye after a similar experience due to wearing too large an eye.

I would not have believed it possible to introduce into the orbit such large eyes. I have seen one which prevented all

movement of the lids. I was written to concerning this patient, who believed he had a tumor of the orbit, while in reality the pains were caused either by the exaggerated size of the eye or by the bad state in which it was found. Nevertheless, in this case the eye had been furnished by a Parisian manufacturer; in the two other cases they were obtained from a pharmacist and an optician.

I insist upon these details, desiring to impress the fact that an artificial eye is not beneath the consideration of the practitioner, and that it well merits his attention. If he does not provide it himself, he should at least examine it, and not permit the use of an eye until he has assured himself of its perfect adaptation.

Complications Which May Be Produced by an Artificial Eye.

Formerly, the artificial eye was accused of causing serious troubles in the well eye, such as "discharges, inflammations, cataracts, and amaurosis." These beliefs were so strong that Mauchart tells us that even in his time the surgeons dared not advise the use of one. To-day we are free from these prejudices, and the artificial eye is no longer accused of encouraging these formidable sympathetic troubles. Possibly this is so, in part, because to-day it is so much easier than formerly to procure an artificial eye well made and well adapted.

Nevertheless, the artificial eye in the orbit constitutes a foreign body, and may become the cause of irritation. Such irritation attains its maximum when the eye becomes rough and engenders, therefore, the painful phenomena of which we have written above. There may result from it a conjunctival inflammation and oedema such as to cause the eye to be pushed out of the orbit. In other cases the use of the eye may bring about an abundant supuration.

The first thing to do is temporarily to remove the artificial eye, and not to return it until all inflammation shall have disappeared. Granulations should be excised or modified by touching with the crayon of nitrate of silver; the purulent discharge should be treated by antiseptic washes and by instillations of collyria of nitrate of silver and of sublimate.

In certain cases the stump maintains an exaggerated irritability, and cannot bear the contact of the artificial eye. Such intolerance is especially observed when the stump is the final result of a violent inflammatory process. Patience is then required, and if, in spite of time, this sensibility does not disappear, it can be reduced by enucleation of the stump; but the æsthetic advantages of the artificial eye are thereby diminished, and its mobility is restricted.

The use of too large an eye sometimes results in effacing the inferior cul-de-sac and in compromising the stability of the eye. Frequently the removal of the eye during a longer or shorter time permits the eyelid to regain its tonicity. A procedure which has given me good results when the effacement of the cul-de-sac was very marked is as follows: two needles, carrying a thread, are inserted into the most retracted portion of the cul-de-sac, 1 centimetre apart, and brought out below the cartilage, and the loop thus formed is drawn in such a way as to form an entropion. Preferably a silver thread should be employed, which may be left in place during a considerable time, precaution being taken to tie it anew from time to time.

To remedy the forcing down of the upper lid in patients with prominent orbital margin, Critchett advised the following procedure: ligature with a silver thread above the lid, including a cutaneous fold large enough to draw the lid up.

De Wecker prefers to use a sub-cutaneous loop, binding the orbicularis with the frontal muscle.

This inconvenience will be better overcome by giving the artificial eye a special form.

Under such circumstances, an eye may be made with a slight projection on the back which is supported on the stump while its prominent upper border pushes back and maintains the upper lid.

The ordinary form may also be used by lengthening and turning in the upper border of the cup so as to form a kind of arch which rests against the orbit, and on which the lid is reflected. In this case the eye is supported on the stump only by its lower border.

It would be difficult for the practitioner himself to make such complicated models. The patient should be sent to an intelligent and skilful manufacturer. The latter will usually destroy five or six eyes before attaining the desired form. Unfortunately, such eyes will have little mobility.

Obstacles to the Use of an Artificial Eye; Operations Which May Become Necessary.

The obstacles to the use of an artificial eye may arise from the eyeball, the conjunctiva, or the lids.

(a). The only obstacle which may arise from the eyeball itself is its size. Whenever the eyeball is larger than normal, or the diminution in the size of the eyeball is not enough to permit of the introduction of an artificial eye, however small, a preliminary operation is necessary. Since the operation is done in view of the use of an artificial eye, the surgeon should take pains to leave a large stump: the operation which best fulfils these conditions is excision of the anterior hemisphere. Rittérich, in such cases, has withdrawn the greater part of the vitreous by a puncture, so as to induce the natural atrophy of the organ.

(b). On the part of the conjunctiva, there may be cicatricial bridles or a complete symblepharon.

It is sometimes sufficient to cut the bridles and immediately apply the artificial eye to prevent their reformation.

At other times they are made to disappear by simple dilation, by inserting larger and larger eyes.

A third procedure avoids this difficulty, and consists in making indentations in the artificial eye corresponding to the bridles, but the mobility is less in this case.

Symblepharon, adhesion of the two lids, is a more serious obstacle.

Rittérich advises separation of the two lids and the insertion of an artificial eye to prevent this reunion. This method is insufficient: during the first days the artificial is tolerated, although it is not firm in the absence of cul-de-sacs. But it is quickly driven from the orbit by the cicatricial process. A new

attempt must then be made, only to see the same inconveniences repeated in a few days: patient and surgeon soon become weary.

Recourse may be had to conjunctival grafting.

Haltenhoff (1) has replaced the conjunctival mucous membrane with flaps from the skin of a frog. This method seems to give passable results, especially in complete symblepharon.

Wolfe (2) borrows the conjunctival mucous membrane from the eye of a rabbit. The patient and the rabbit are simultaneously chloroformed. When the adhesions of the lids have been separated, the portion of the rabbit's conjunctiva which is to be transplanted is outlined by an incision. Threads are passed through this flap, which serve to stretch the mucous membrane, which is detached with a few cuts of the scissors. Holding the flap stretched by the threads, it is quickly fitted to the freshened surface of the lid. It is well to have many sutures, to insure cohesion, and to place in the middle of the flap a looped suture which penetrates the lid. A true autoplasty may be performed by taking the mucous membrane from the patient himself: the labial or vaginal mucous membrane is then chosen.

These different methods, direct autoplasty or transplantation of animal mucous membrane, have one inconvenience: the result is not permanent. The transplanted mucous membrane proliferates, and the artificial eye is soon expelled.

Finally, an obstacle to the use of an artificial eye may arise from a deformity (ectropion, coloboma) or an absence of lids. In such cases recourse must be had to more or less extensive autoplasties the description of which is not within the scope of this article.

(1) HALTENHOFF: Conjunctival Transplantation. (*Rev. de la Suisse rom.*, 1875.)

(2) WOLFE: Transplantation of the Conjunctiva of a Rabbit to the Human Eye. (*The Lancet*, April 8, 1879.)

AMBLYOPIA AND ATROPHY FOLLOWING CARDIAC TRAUMATISM

By Dr. VALUDE.

The case is that of a vigorous man, a butcher, thirty-six years of age, who, early in October, 1894, was the victim of an accident from a carriage. Passing under a porte-cochère, he was forcibly pressed against the wall by the shaft of his cart. He *did not fall to the ground*, and his head was not in the least injured; there was merely violent pressure of the chest at the sternum and sixth, seventh, and eighth ribs of the left side, without wound and without fracture.

Dr. Roustan (of Creil), who saw the patient soon after the accident, thus describes his condition: "He was at once supported and carried to a bed, but for more than two hours was so pale and cold that he was thought to be dead. I saw him about four hours after the accident; the heart was scarcely beating, the pulse imperceptible, the patient cold and prostrated, although able to answer questions. Thanks to a few injections of ether and of caffeine, to the administration of quinine and of nux vomica, the heart resumed its action, but the pulse-rhythm was not re-established until the next day. It had been imperceptible for several hours, and then irregular. Meantime, the patient had spit a little blood."

The patient himself says that he was unconscious for several hours, and remained four days in bed. His chest was contused, and there was a slight sinking in of the lower false ribs of the left side.

As he emerged from syncope his thoughts and memory were confused. This cerebral disturbance gradually disappeared during the ensuing days, and his muscular strength returned.

At the same time he became conscious of visual disturbances, which were at first severe enough to prevent him from seeing and counting his fingers. On the eighth day he was able to get up, but was still unable to see. He was at that time in full possession of his faculties, and on the tenth or twelfth day

after the accident his sight began to return. Improvement continued day by day, but so slowly, that on the 17th of October, about three weeks after his accident, the patient came to me for advice.

I found him in his usual condition of strength, active and vigorous of limb; his heart beat with regularity, his arteries were healthy.

The eyes were fixed, the pupils moderately dilated, with the aspect of amaurosis; the right eye was able to see and count fingers at 3 metres, the left eye at 50 centimetres. The ophthalmoscope showed the following conditions: The fundus of the eye was covered by a bluish-gray haze, more pronounced around the two maculae, especially in the left eye, where the cloudiness formed a marked aureola around the macula; the macula itself was of a garnet-red color, hemorrhagic, in appearance like a flea-bite. The arteries were exceedingly small, slender, and apparently empty, but did not seem to be atrophied or whitish; the veins were not exactly tortuous, but seemed to be very full of black blood. The papilla itself was perfectly normal.

In fact, the ophthalmoscopic appearance was that, not of embolus, but of ischæmia of the retina, such as may be observed during certain extensive hemorrhages, or during the algid stage of cholera. It was an ischæmic condition of the arterial circulation of the retina.

Treatment consisted in the daily administration of trinitrine and inspirations of nitrite of amyl.

October 22.—No change in the visual condition. *November 7.*—Under the treatment, the acuteness of vision is apparently a little higher in the right eye, but both optic discs are of a whitish appearance, and the arteries have the same thinned aspect. Injections of antipyrine, which have given encouraging results in some cases of optic atrophy, are next resorted to.

November 20.—The papillæ are even whiter than before; the left one especially is quite atrophic.

On the right side the macula is normal; on the left, the macular region is occupied by a long reddish triangle, its base

turned upward, which is the more easily seen because the peripheral oedema of the retina has disappeared. This oedema has left upon the surface of the reddish triangle of the macula some small spots of a dull white color, arranged circularly around the fovea centralis. Were they not so small, dull, and lustreless, these spots would resemble the constellation of albuminuria. They are like a fine powder, quite difficult to perceive at first, and exactly represent the macular lesion characteristic of retinal ischaemia. The left eye can see to count fingers at 1.50 metres, and the right eye at 2.50 metres.

The optic atrophy was already at an advanced stage, and appeared to be irremediable.

What was the pathogenesis of this case? Any previous pathological condition of the eye must be excluded. The man was the best shot of his regiment, and the possessor of perfect sight.

Was there direct lesion of the head? The physician who first saw him states positively that there was not the slightest contusion of the head, and that, moreover, he did not fall. Neither was there any hemorrhage from nose or ears, nor headache, nor any vomiting except on the first night of the accident, after the ingestion of medicine.

We are therefore obliged to return to the accident itself, which consisted of a violent pressure of the cardiac region, followed by prolonged syncope, and a veritable asystole of several hours' duration, necessitating the use of caffeine. It is, moreover, to be noted that the eye most affected by amblyopia, and showing the greatest number of lesions, is the left eye—the one under the influence of the left carotid artery. We know that central circulatory disorders of cardiac origin are chiefly felt upon the left side, or at least show their most marked effects there.

We have, in brief, found in this patient retinal circulatory disorders analogous to those met with in profound disturbances of the circulatory system (extensive loss of blood, algid stage of cholera), and these ocular symptoms were, in fact, caused by a serious disturbance of the circulation, since the

heart had been so severely contused that syncope, which at first seemed likely to be fatal, had ensued, and was followed by a prolonged asystolic period.

That this reflex or synergistic contraction of the retinal vessels should in this case have been permanent, and have so rapidly ended in atrophy of the nerve trunk, is a remarkable and interesting fact, the more especially because the process is entirely ocular. The encephalic vessels would seem to have regained their vital power, for the patient had no headache, and his mental faculties and memory were completely restored.

I have thoroughly searched the literature upon the subject, and have found that these phenomena of ischæmia of the retina followed later by atrophy of the optic nerves occur as a result of severe syncope, but the syncope is always caused by abundant loss of blood or a grave general condition. I have met with no recorded case similar to this one, in which the vascular disturbance was due to traumatism of the cardiac region without loss of blood.

COMPLETE PARALYSIS OF THE LEFT MOTOR OCULI IN A CHILD OF FOUR YEARS— RECOVERY

By Dr. **De SPÉVILLE.**

On the 18th of July, 1893, a child, P——, four years of age, was brought to me in consultation, because of complete closure of the left eye a few days previously. I found total paralysis of the motor oculi of the left side. There was complete ptosis. Upon lifting the eyelid, the eye was found to be entirely deviated outwardly as far as the external commissure, and perfectly immovable. Movements of elevation, depression, and adduction were abolished. The pupil was dilated to its fullest extent. The fundus was normal; there was no exophthalmus. Owing to the tender age of the patient, it was difficult to ascertain whether there was diplopia. The child was lively, and did not seem to be suffering. In spite of the most careful examination, I was able to find no sign of hereditary syphilis.

Two years previously, the little patient had had measles, since which time his health had been excellent. Eight days previous to examination he became nervous and cross, and lost his appetite. The father stated that he had slight fever unaccompanied by headache; the result, twelve hours later, of this slight pyrexia was complete closure of the left eye.

Family history was negative. The parents were robust and healthy. The father declared that he had never contracted syphilis. His wife had never miscarried, but had lost two children a month after birth from excessive heat. They had no spots upon the body, nothing upon the lips or anus. Nine days ago the mother gave birth to a fourth child in sound health.

I prescribed daily friction on the forehead and left temple with Neapolitan ointment about the size of a pea; 20 centigrammes of potassium iodide daily, and every two days periorbital electrization with the continuous current. At the end of a month the cure was complete, and has remained so up to the present time (October 15, 1894). Treatment was continued fifteen days after the recovery.

This is an interesting case of complete acute paralysis of the motor oculi, occurring without appreciable cause, and with very rapid recovery.

The cases of ocular paralysis in childhood which have so far been published do not show the same appearance and course as this.

The most striking fact here is that the motor oculi was affected in its entirety (the branches of the extrinsic as well as of the intrinsic muscles). This has not occurred in the cases already published, as some of the muscles innervated by the third nerve have, either wholly or in part, retained their functional power.

This was the condition in a case of paralysis, apparently congenital, reported by Dr. Parinaud: "The action of the superior and inferior recti was *nil*, as well as that of the inferior oblique, to judge by the exaggerated action of its antagonist, the superior oblique. As to the internal rectus, it contracted normally for lateral adduction, but did not contract for convergence. The slightly dilated pupil did not react to accommodation, but reacted readily to light. The levator palpebræ was intact. Amblyopia, which was pronounced, did not allow me to determine the state of accommodation." (Paralysis of the Movement of the Convergence of the Eyes, Obs. VIII., in *Brain*, 1886.)

The same is the case in Samelsohn's report (Society of Heidelberg, 1888. Discussion of a paper by Al. de Græfe). The case was one of congenital paralysis with divergent strabismus of the left eye, with the following characteristics: "The left associated movements were preserved, the right associated movements were lost. Convergence was nevertheless possible, because the left internal rectus, which did not contract for lateral adduction, contracted for convergence. Another peculiarity consisted in the fact that both eyes could turn to the right individually, but not simultaneously.

The clinical aspect of these two cases of paralysis of the motor oculi differs entirely from that of my case. While in the patients of Drs. Parinaud and Samelsohn there was disassocia-

tion of the action of the internal recti for the movements of adduction and of convergence, in ours the nerve which was affected throughout its whole extent resembled classic paralysis of the motor oculi in the adult. Moreover, whereas the paralysis was of congenital origin in the two former cases, in this the cause was obscure. To what, indeed, can it be attributed? An exact answer it is difficult to make. Nothing was found in the patient which would throw any light upon the nature of the functional disorder of the nerve. His health at the time the paralysis occurred, and, indeed, ever since his attack of measles, has been excellent.

Could hereditary syphilis be responsible for the attack? The patient does not show, and never has shown, any of the symptoms of this disease. The father declares that he never had syphilis, the mother has never aborted, and with the sole exception of the death of two infants a month after birth there is no indication that could lead us to suppose syphilis to be a determining cause.

Is it not more likely that there was some infectious process of undetermined nature? Would not the nervousness, loss of appetite, and slight fever which preceded the ocular trouble, as well as the rapidity with which this occurred, sustain this theory?

The complete absence of diplopia is noteworthy; after eight days of treatment, the improvement being already marked, the right eyelid was decidedly raised, but the eye still showed great divergence; yet the child never appears to have seen double, and was in nowise incommoded by the divergence of the two visual lines.

II.—REPORTS OF SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of April 2.

Palpebral Scleroderma.

DR. DESPAGNET presented a young girl sixteen years old, without neurotic or other history, who for a year past had noticed the appearance and development at the free border of the upper lid of the left eye of a slightly elevated plaque, surrounded at first by a dark border, and from which the lashes had fallen away.

This might be either a vitiligo or scleroderma. Drs. Balzer, Hallopeau, and Brocq considered the lesion as of sclerodermal nature, of the sort described under the name of *morphea alba plana*.

Mercurial inunctions at the site of the lesion and electrical treatment seemed to have arrested the development of the disease.

Symmetrical Keratitis of Undetermined Nature.

DR. DESPAGNET presented a man sixty years old, who for five years had been troubled with peculiar corneal lesions, which had not been influenced by any treatment. The patient had no antecedent history, no sign of unfavorable diathesis. Although his general appearance was somewhat cachectic, there was neither sugar nor albumen in the urine, no gout, and no rheumatism. The corneal disturbance was essentially characterized by a gray coloration of the periphery of the cornea. The corneal opacity was in contact with the limbus. There was not, as in gerontoxon, a transparent ring interposed. There were no superficial disturbances.

The disturbance was accompanied with peri-corneal injection, more or less distinct at certain periods, but never disappearing completely. There was also some photophobia and lachrymation. There seemed to be no participation of the iris or of the ciliary body in the process. The disturbance had developed symmetrically, while in the left eye the opaque corneal ring was more distinct, and only the centre of the cornea was still transparent.

He intended to limit the invading process by cauterization with the galvano-cautery, not outside of the lesion, but within it, toward the centre of the cornea.

Dr. Parent thought that this was a case of sclero-keratitis. This disease is more particularly met with in rheumatic and gouty subjects. General treatment with salicylate of soda; the alkalies and iodides should be employed. Cauterization from the side of the ciliary body rather than from any other point was indicated.

Dr. Valude had treated this patient for two years and a half. Prolonged general treatment and cauterization with the galvano-cautery at the limbus were of no avail.

Retinal Ischemia; Optic Atrophy Following a Cardiac Traumatism.

DR. VALUDE.—(*See article in full in this number, p. 266.*)

Dr. Gorecki.—This case raises a medico-legal question. In traumatic retinal hemorrhages, should it be said that the hemorrhage is due directly to a traumatism not acting directly on the eyeball, or should it be said that the production of the hemorrhage requires a predisposition on the part of the subject? I have seen a localized retinal hemorrhage following a traumatism accompanied with syncope, in a colleague, who had recovered from a former slight attack of herpetic sclerosis. In this case there was evidently a predisposition.

Ocular Troubles of a Bicyclist.

DR. DUBOYS DE LAVIGERIE.—A professional rider, twenty-four years of age, was attacked with peculiar visual disturbances during a twenty-four-hour race made in very cold weather. About the eighteenth hour he noticed that his vision was disturbed, that he steered badly, and that he ran into the other machines. Dr. Duboys found a diffuse disturbance of both corneæ without superficial lesion. He prescribed warm lotions and rest. On the same evening the vision commenced to improve; on the next day the corneæ had regained their normal appearance and the vision had its usual acuity. This trouble, according to the author, was due to the cold.

Indeed, during the night of the race in question, from the 2d to the 3d of February, it was very cold, and the thermometer sunk to -10° – -12° . It must be added that during the entire race there was a corps of forerunners (trainers) who broke the force of the wind behind them. They were followed by the racers, and, so to speak, each racer was protected by a forerunner mounted on a bicycle, or forerunners on a tandem. The current of air which was thus made was so violent that if a crumpled paper was placed on the track when the racers passed by the paper rolled along and was drawn after them for several metres.

Ocular Disturbances Following Influenza.

DR. GALEZOWSKI related three cases of localized retinal hemorrhages in patients who had formerly had probable attacks of influenza. In these cases no other morbid influence could be given as cause. One of the patients was a youth of sixteen years; the other two were past forty. Dr. Galezowski referred the retinal lesions to infectious cerebral disturbances caused by influenza, recently described by Dr. Cornil.

Dr. Despagne.—Among the various disturbances which may be produced by influenza I will describe an interesting case: A patient, after his first attack of influenza, had a passing visual disturbance, for which he did not consult a specialist. After the second attack, the visual disturbances reappeared with greater intensity and persistence. There was in the left eye atrophy of the papilla with diffuse borders (neuritic atrophy), and in the right eye, signs of peri-neuritis. Subcutaneous injections of cyanide of mercury had brought about decided improvement, and the narrowed visual field was much enlarged.

Dr. Chevallereau.—To attribute retinal hemorrhages to influenza, more precision should be employed in the etiological research. I have seen many cases of herpetic keratitis which appeared to me of grip origin; but the hemorrhages of the retina may only be a pathological coincidence.

Dr. Valude.—The ocular disturbances of influenza are generally characterized by infectious or suppurating regions of various parts of the eye or the orbit. I have seen a case of orbital cellulitis in the course of grip which was followed by complete atrophy of the optic nerve. The cases of Dr. Galezowski are unusual, and merit special attention.

Dr. Parinaud.—In epidemic diseases which attack many people, such as influenza, there is danger of attributing to the epidemic disease ocular disturbances which have no direct relation to it. Retro-bulbar neuritis is one of the troubles which may develop during or after influenza, but is not peculiar to it; it may complicate many infectious diseases. I have noticed this same retro-bulbar neuritis sixteen years ago in a case of erysipelas. I have also described it under the name of rheumatic neuritis; it may be caused by an abscess of the lid or of the throat, by coryza, etc.

It is of some consequence to know this in influenza in relation to the pathogenesis of the cerebral disturbances described by Professor Cornil. This retro-bulbar neuritis—that is to say, peripheral—may, indeed, complicate various cerebral disturbances, such as paralysis

of the tongue, of the face, hemiplegia, and mental disturbances. It is curious that these cerebral disturbances generally develop after the ocular disturbances; it is after the eyes are better or have recovered that the other nervous symptoms develop. These cerebral disturbances, such as retro-bulbar neuritis, are relatively benign, and tend, naturally, to recovery.

The retro-bulbar neuritis of influenza is most frequently bilateral. When it is complicated with various cerebral disturbances, one is tempted to believe it a neuritis of intra-cranial origin of quite different character. The differential diagnosis is easy if the very typical characteristics of rheumatic neuritis are remembered, which are found in the neuritis of influenza, which, besides, is frequently due to cold.

Dr. Antonelli.—In regard to vascular lesions in grip affections of the fundus of the eye, I wish to say that in one case the retina showed traces of former hemorrhages, but it was remarkable that no vessels were seen, either on the papilla, which was quite white, or in a large part of the retinal field.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of March 14, 1895.

A Case of Bilateral Optic Atrophy, with Peculiarities in the Visual Field.

MR. OGILVIE described a case of a man fifty-seven years old, a moderate smoker, who had experienced a diminution in vision beginning in December, 1893. He had formerly had attacks of epilepsy, and was a descendant of a neurotic family.

The movements of the eyeball and the pupil reflex were normal. In October, 1894, there was :

OD. V = $\frac{1}{3}$.

OG. counts fingers at ten feet with peripheral vision.

There was mixed astigmatism in both eyes. There were floating opacities in the vitreous, a discoloration of the optic papillæ, and tortuosity of the retinal veins. There was a congenital posterior staphyloma in both eyes.

The right visual field was narrowed for colors and for white. The

lower internal sector was lacking in the left eye, and the visual field was also narrowed, and there was complete inferior hemianopsia.

No sugar or albumen in the urine. No syphilis. No alcoholism.

The patellar reflex was exaggerated.

It seems, from a former consultation, that he had already had an attack of optic neuritis; this was, then, atrophy of the papilla following neuritis.

In February, 1895, the upper and lower quadrants of the right visual field were absent, and the appearance was that of a right latent hemianopsia.

The patient worked in a tobacco manufactory, but his disease did not seem to be related to his occupation, as there was no central scotoma, and he experienced no improvement on abandoning his occupation. This was probably a hybrid affection—that is, an atrophy of the optic nerve combined with a congenital condition called coloboma by Fuchs.

Mr. James Taylor said that lesions of the occipital lobe should not be thought of in this case.

Mr. Bronner asked if the patient had not been unconsciously poisoned by lead.

Continuation of a Case of "*Filaria Loa*."

MR. ARGYLL ROBERTSON gave the continuation of the case of *filaria loa* which he reported at the session of October 18, 1894. (See *Annales d'Oculistique*, November, 1894, p. 336.)

After removal of the parasite the patient experienced no trouble for six weeks.

On February 6 the parasite was again seen and felt.

Two days later a swelling appeared in the right temporal region.

On February 13 the worm was felt under the right upper lid. An incision was made, and after dissection a filamentous body was found, smaller than the ordinary filaria. Deeper in the tissues was a well-developed filaria.

The blood was carefully examined from time to time during these last six months, but it was impossible to find a trace of filaria, or its embryo. At times, the patient had swellings of the arm.

The origin of the filaria in this patient was impure water.

Swellings of the arm, it seems, are of frequent occurrence in the inhabitants of the neighboring isle of Calabar.

An Unknown Form of Iritis.

MR. BAILEY had frequently seen in syphilis a deferred iritis occurring about thirteen years after the period of invasion. This iritis is bilateral, and has the appearance of serous iritis with, frequently, participation of the ciliary muscle. There is little tendency to the formation of synechia, but rather to secondary glaucoma.

At the same time, the patient may evince other symptoms of syphilis, such as ozena, disseminated choroditis, etc.

Sometimes there is a similar iritis in cases of hereditary syphilis, generally at about the age of twenty-one years.

In certain cases, relatively rare, the iritis may assume a more serious form, and the pupil may be obstructed by a layer of gray lymph. Sometimes this variety is accompanied with intra-corneal deposits starting from the posterior surface of the cornea, and forming a triangular plaque without vessels.

Sometimes, but very rarely, the iritis may be gummatous with possibly peripheral anterior synechia, or adhesive, bringing about occlusion of the pupil with secondary glaucoma.

Sometimes a slight interstitial keratitis is followed some months later by a gummatous iritis, and, on the other hand, an iritis such as has been described, with obstruction of the pupil and triangular corneal deposits, is accompanied with disseminated opacities in the cornea.

The characteristic teeth of hereditary syphilis are very rarely met with in pure serous iritis, while they are quite frequent in the forms associated with interstitial keratitis.

Mr. Spencer Watson found nothing new in this communication. All oculists had occasion to see cases of hereditary interstitial keratitis followed by iritis.

A Case of Traumatic Cataract with an Intra-crystalline Foreign Body.

MR. SPENCER WATSON described the case of a workman, twenty-nine years old, who after an ocular traumatism complained of loss of vision. He had not noticed that a foreign body had entered the eyeball. The patient came for consultation on June 22d, and he had noticed a diminution in vision since the month of November. The lens was not opaque in the lower internal quadrant, and a yellowish-white foreign body could there be seen. There was a cicatrix in the

cornea. On January 6 discission was performed. Three days later a linear extraction was made, and the foreign body was removed at the same time. One year after the operation he could read Jaeger 4 with +18 D.

The nature of the foreign body was not determined.

ACADEMY OF MEDICINE

(PARIS)

Session of March 12.

Empyema of the Maxillary Sinus Complicated with Orbital Osteo-Periostitis, with Perforation of the Vault, Abscess of the Frontal Lobe, and Atrophy of the Optic Nerve.

DR. PANAS.—Many cases of amaurosis, of paralysis of the motor nerves of the eye and of the trigeminus, have passed unnoticed, or have been wrongly interpreted through ignorance of the pathology of the naso-frontal sinus.

A patient recently came under my care with a dental lesion on the right side (superior molar) and amaurosis on the same side. On ophthalmoscopic examination the fundus of the eye was healthy, but there was orbital plegmon. Trepanning of the maxillary sinus was followed by improvement. But soon the symptoms of meningitis appeared, and the patient died; the amaurosis remained up to the end.

The pus from the maxillary sinus contained the staphylococcus aureus; that at the base of the brain contained only streptococci. There had been perforation of the floor of the orbit, then of the vault, and extension to the meninges. The optic nerve had been compromised by the periostitis; afterwards it was altered, and the changes extended from the optic fascia of the opposite side to the retina without affecting this. Finally, there was an abscess in the frontal lobe.

SOCIETY OF OPHTHALMOLOGY AND LARYNGOLOGY
OF BORDEAUX*Session of November, 1894.***A Case of Tenonitis.**DR. PUECH.—(See *Annales d'Oculistique*, February, p. 159.)**Bacteriological Researches in a Lachrymal Tumor with Bacilli.**

DR. MAYET.—In the month of March last a woman came to Dr. Lagrange's clinic with a lachrymal tumor. The tumor was punctured, and the pus was aseptically collected with a Pasteur pipette, to be cultivated in the usual manner.

The cultures, made in Petri boxes, produced two kinds of colonies.

Each of these colonies was formed by bacilli. The first was a bacillus from 4 to 5 μ long, somewhat rounded at the extremities; the other was 5 to 6 μ long, and was formed of zoöglia.

The first bacillus was not pathogenic, and produced no result on inoculation; the second, on inoculation, produced serious disturbances of infection.

The injection of one drop of the culture in the anterior chamber had produced in four days an intense panophthalmitis, with perforation of the sclera at the lower anterior portion.

Inoculation in the skin of a rabbit's ear produced an abscess.

Various cultures made with this pus showed the inoculated bacillus.

Lastly, injection of three-quarters of a cubic centimetre in the auricular vein of a rabbit of 600 grammes' weight killed it in less than twenty-four hours. Cultivation of the blood of the auricle produced anew the injected bacillus.

*December Session.***Melano-sarcoma of the Lids.**

DRS. FROMAGET and CABANNES.—The case was that of a man whose upper left lid, after a traumatism in June, 1890, had increased in size and was distended by a large infiltration of blood. Several weeks after, the skin resumed its normal color, and the patient then found in this lid a hard tumor the size of a walnut,

somewhat longer horizontally, and projecting under the raised and deformed lid.

The bulbar conjunctiva showed a few melanotic spots. The tumor was removed in September, 1890, by Dr. Lagrange; the patient left as cured a short time after, but returned in a few months with a recurrence, including, this time, both lids.

The skin was not changed, nor was it adherent to the subjacent tumors; there were melanotic spots on the conjunctiva and the border of the lids.

Above the lower orbital furrow, through the unaltered skin, a projecting tumor could be seen, the size of a walnut, in the lower cul-de sac, independent of the *squelette palpebral*, but adherent to the conjunctiva, which presented a grayish pigmentation, with here and there disseminated melanotic spots.

The tumors were removed with the attached mucous membrane, but the skin was left.

Histological examination of the tumor from the lower lid showed that it was a fasciculated sarcoma; furthermore, scattered here and there were cells containing melanotic pigment; these cells were found localized in certain points, but were few in number. The greater part of the tumor did not contain them. This was not the case with the recurring tumor of the upper lid. This tumor was almost entirely composed of cells filled with melanotic pigment. However, at the point of implantation of the tumor was a pure fasciculated sarcoma, free from pigment. Several months after, the patient came to me again with a third recurrence.

Sub-conjunctival Serous Cyst.

DRS. PUECH and FROMAGET.—A woman who had formerly had *tænia*, but who had recovered from this trouble, had a cyst with transparent walls in the lower conjunctival cul-de-sac. This cyst was the size of a pigeon's egg.

As the patient refused to have it completely removed, it was punctured, and a portion of the pocket was excised. The serous liquid was examined, *en masse*, some time after extraction; it contained numerous white cells, some red blood cells, and epithelial cells.

The wall of the cyst was composed without of conjunctival tissue, which differed in no way from sub-conjunctival tissue, except in being a little denser.

Within were four or five layers of polygonal epithelial cells, quite large in size, and which were deeply stained with reagents.

According to the authors, this was a congenital dermoid cyst, resulting from an inclusion of the conjunctiva at that point.

MEDICAL SOCIETY OF BORDEAUX

Session of March 8.

A Case of Diphtheritic Ophthalmia Treated with Serum.

DR. LAGRANGE.—A child one month old was attacked in the right eye with a pseudo-membranous ophthalmia with thick and adherent exudate. Examination of the false membrane showed a pure diphtheritic process. There was a serous discharge from the conjunctiva.

An injection of 10 c. c. of Roux's serum was made, but in concurrence applications of lemon juice were made. A second injection brought about disintegration of the false membranes, and the ophthalmia terminated in a phase of suppurative reaction.

In a few days the process had terminated, and there remained only a harmless conjunctival catarrh without corneal lesions. The injections of serum were unaccompanied with general disturbance of any sort.

Later a peri-articular abscess with staphylococci formed, which seemed to have no relation to the treatment or the disease itself.

ANATOMICAL AND PHYSIOLOGICAL SOCIETY OF BORDEAUX

Session of February 18, 1895.

Imperforate Lachrymal Openings.

DR. LAFITE-DUPONT.—The case was that of a child who had from birth suffered from lachrymation. On examination there was found to be complete absence of lachrymal orifices in the left eye, and, in the other eye, only the superior lachrymal opening was present. This was evidently a congenital malformation, which seemed also to be hereditary.

The mother, indeed, had lachrymal openings, but she always had

and still suffered from lachrymation. Her father, during his entire life, had been troubled with the same lachrymation.

The grandfather and the mother, then, had defective lachrymal canals, since they did not fulfil their functions. It must also be mentioned, as co-lateral proof, that a young brother of my patient had been operated upon by Dr. Lagrange for a cyst of the lachrymal sac. The development of this cyst was due to imperforate lachrymal openings of that eye. The other eye was normal.

In the child in question there was only the superior lachrymal opening in the right eye. The fact of its presence above and absence below seems to explain the development of the nasal canal. For, according to Born and Legal, the primary epithelial cord, origin of the lachrymal ducts, is directly continuous with the upper lid; the upper canaliculus will be the first formed, while the lower canaliculus arises from the descent of a process from the upper canaliculus.

According to Ewetsky, on the other hand, the upper extremity of the epithelial cord first enlarges, and is then divided by a partition of connective tissue.

The facts of this case of malformation seem to favor the theory of Born and Legal.

MEDICAL SOCIETY OF BUDAPEST

Session of January 25.

Congenital and Symmetrical Ectopia of the Lens.

DR. WEISZ.—It is known that congenital ectopia of the lens arises from a partial lack of development of the zonula of Zinn. This arrest of development is commonly associated with a similar modification in the iris and the choroid. The author has seen two cases of this lesion which were symmetrical in both eyes.

The first of these cases was a young man fifteen years old, who had an internal subluxation of both lenses, without coloboma of the lens, and without lesions of the fundus of the eye. Vision was: OD. = $\frac{2}{8}$, with + 16 D. = $\frac{6}{8}$; OG. = $\frac{6}{8}$ (?), with + 18 D. = $\frac{6}{8}$. These are curious results. The visual acuity of both eyes with + 16 D. was $\frac{6}{8}$.

The second case was that of a girl twenty-one years old, who not only had ectopia of the lens, but in addition had congenital aniridia. The lens was cataractous, immovable, and fixed above to the ciliary body. The fundus of the eye was normal. The patient counted fingers at 1 metre, and the vision was somewhat improved with glasses + 10 D. There was also horizontal oscillatory nystagmus.

Session of February 5.

Spasmodic Infantile Hemiplegia with Atrophy of the Optic Nerves.

DR. BRAUN.—A child ten years old had suffered with clonic spasms since the age of two years. The parents stated that at first these contractions were preceded by paralysis of the face and left arm. Later, when the child began to walk, it was noticed that there was paralysis of the left leg. After the paralysis came a period of chorea.

There was actually hemichorea and hemiathetosis, and the left arm and leg were paretic. The left side of the face was also paretic. The patellar reflex was exaggerated. Lastly, the optic nerves were both atrophied. The author thinks that there was an embolism of the sylvian artery, and asks what connection there could be between the atrophy of the optic nerves and this lesion.

MEDICO-SURGICAL SOCIETY OF BRABANT

Session of March 5.

Diphtheritic Conjunctivitis and Sero-therapeutics.

DR. LANTSHEERE reported the case of a child eighteen months old with conjunctivitis of the left eye having manifest clinical characteristics of diphtheria: lids hard and large; skin smooth and dark-red; conjunctiva thick, yellowish, shining, and hard; grayish serous secretion; no false membranes. The conjunctiva seemed to be hard as wood. After fifteen days, although the condition of the eyes was satisfactory, there were white plaques in the pharynx and false

membranes in the nose. Respiration was difficult and painful; the general condition was bad; convulsions.

Three injections of anti-diphtheritic serum of 10 c. c. each brought about an improvement, first of the general condition, and then of the local disturbances in the pharynx, nose, and eyes.

In cultures and on repeated microscopic examination, only streptococci and cocci were found. Nevertheless, the injections of serum seem to have had a really beneficial effect. This case confirms the opinion of Landouzy, who has already noticed the curative effect of serum in tonsillitis with streptococci pure and simple.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Wiestnik Oftalmologii

Reviewed by Dr. MUTERMILCH.

January and February, 1894.

I.—Spontaneous Recurring Hemorrhages in the Vitreous and Development of Compact Connective Tissue in the Vitreous and in the Retina, by Dr. CHODINE. (To appear)

II.—Adonidine as an Anæsthetic for the Eye,

by Dr. KATZAOUROFF.

From personal investigations, the author reaches the following conclusions :

1st. Contrary to the opinion of Rommel (*Gräfe's Archiv*, XXXIV., 3, p. 96), who has never seen symptoms of irritation following instillations of adonidine in the human eye, the author holds that these are of constant occurrence.

2d. This remedy is frequently inefficient in cases where cocaine acts in a satisfactory manner.

3d. Anæsthesia caused by adonidine is very often unequal in the various regions of the anterior segment of the eye; the conjunctiva is the least anæsthetized; the greatest anæsthesia is found in the lower portion of the cornea.

For these reasons, the author is not in favor of the use of adonidine as an ocular anæsthetic.

III.—The Comparative Action of Sublimate, Bi-iodide of Mercury, and Sulphate of Copper in Trachoma,

by Dr. DEBAGORY-MOKRIEWITH.

The author's investigations lead him to the following conclusions :

1st. Bi-iodide of mercury should always be used instead of sublimate, as it is less irritating to the eye and has superior antiseptic properties.

2d. Under the action of sublimate and bi-iodide of mercury, absorption of the follicles, of the papillæ, as well as of the sarcomatous infiltrations, occurs more slowly than with sulphate of copper ; these two preparations should only serve as auxiliary media in the treatment of trachoma with sulphate of copper.

3d. Sublimate cannot be considered as a specific against trachoma ; it is rather to sulphate of copper that this property should be given.

IV.—A Case of Persistent Hyaloid Artery, by Dr. SCHER.

March and April.

I.—The Result of Operative Treatment in High Degrees of Myopia by Extraction of the Normal Lens, by Dr. SCHROEDER.

(See *Annales d'Oculistique*, May, 1894.)

II.—Excavations of the Optic Nerve, by Dr. GARNIER.

The author has undertaken a series of anatomical and clinical researches for the purpose of explaining the formation of excavations, which, in the opinion of Schoen, are due to the contractions of the ciliary muscle in the act of accommodation. The author has found physiological excavations in 26% of the pupils of the schools of Odessa (2,594 eyes). The relation of these excavations to refraction is expressed by the following proportion :

Exc. M : Exc. H : Exc. E = 30 : 26 : 24. Garnier explains the formation of excavations by distension of the posterior segment of the eye, causing in its turn changes in the form and disposition of the fibres of the lamina cribrosa ; he says there is no relation of cause and effect between the efforts of accommodation on the one hand and the formation of excavations on the other, as Schoen states. In defence of his opinion, Garnier says that the majority of excavations are seen in myopic eyes ; then follow hypermetropic eyes, and lastly emmetropic.

III.—A Case of Gomma of the Sclera, by Dr. TARNAVSKI.

IV.—An Account of the Eye Diseases Treated in a Private Clinic (1892 to 1893), by Dr. ORLOVSKI.

V.—Forceps for Turning Out and Fixation of the Superior Cul-de-Sac, by Dr. REICH.

May and June.

I.—Spontaneous Recurring Hemorrhages in the Vitreous and Development of Compact Connective Tissue in the Vitreous and in the Retina, by Dr. CHODINE.

The author reports the case of a man twenty-nine years old who had typical spontaneous recurring hemorrhages in the vitreous of the right eye and development of compact connective tissue in the retina and vitreous of the left eye. From his personal observations and a series of cases reported by other authors, Dr. Chodine states that the cause of these hemorrhages is an anomaly in the walls of the blood vessels. The coexistence of frequent spontaneous attacks of epistaxis with these hemorrhages is further proof of this theory. As sequellæ of such hemorrhages, opacities of the vitreous, detachment of the retina, glaucoma, etc., have been observed, as well as development of compact connective tissue in the retina and in the vitreous. It was this development of connective tissue which was found in the author's case.

II.—Diffusion Circles and the Stenopœic Opening, by Dr. KATZ.

In endeavoring to find if a stenopœic opening produces a sharp image in all degrees of ametropia, the author made a series of experiments which led him to the following conclusions :

1st. In all cases of ametropia a stenopœic opening produces a decided correction in vision; when the ametropia is slight (1 D.) complete visual acuity is obtained ($\frac{1}{10}$).

2d. Given the visual acuity obtained by the use of a stenopœic opening 1 millimetre in diameter, and the size of the orifice, given the maximum visual acuity, given the relation between the maximum visual acuity and the visual acuity obtained by a 1 millimetre opening, the degree of ametropia may be found, and amblyopia may be distinguished from ametropia.

3d. When very small stenopœic openings are used (0.1 — 0.4 millimetres) the visual acuity is invariable, whatever the degree of ametropia.

III.—On the Relation of Certain Cerebral Spinal Nerves to the Circulation in the Membrana Nictitans of "Rana Esculentæ," by Dr. SERGIEFF.

IV.—Lactic Acid in the Treatment of Corneal Ulcers,
by Dr. DOLGENKOFF.

The author cauterizes serpiginous ulcers and annular ulcers of the cornea with a 50% solution of lactic acid, and obtains very satisfactory results. The white scar which is produced after the cauterizations disappears in three or four days. The success of this treatment is quite remarkable in cases where there is photophobia with considerable injection of the peri-corneal vessels. In certain cases a single cauterization with lactic acid is enough to arrest the progress of the disease.

V.—A Rare Case of Deep Physiological Excavation,
by Dr. DOLGANOFF.

VI.—An Account of 204 Cases of Cataract Extraction,
by Dr. NICOLUKINE.

July and October.

I.—Diffusion in the Eyeball in Various Pathological Conditions, by Drs. BELLARMINOFF and DOLGANOFF.

The authors have made their investigations exclusively in adult rabbits with the colorimetric process (Bellarminoff); the following are their conclusions:

1st. Pathological conditions of the cornea of acute inflammatory character accompanied by morphological changes in the corneal tissue (abscess, infiltration, recent cicatrix, etc.), increase the diffusion through this membrane.

2d. The degree of diffusion is in direct relation with the extent and depth of corneal tissue invaded by the acute pathological process.

3d. In cases of operative wounds of the cornea (section, iridectomy, extraction), the degree of diffusion depends on the condition of the cicatricial tissue uniting the borders of the wound. When the cicatrices are recent, diffusion is greater. Definitely organized cicatrices cause no change in diffusion different from that of the normal condition.

4th. Permanent changes in the corneal membrane (cicatricial degeneration) diminish diffusion. The degree of diminution is in relation to the extent of surface which has undergone cicatricial degeneration.

5th. In operative wounds of the cornea where cicatrization is accompanied with an inflammatory process (suppuration, infiltra-

tion) diffusion is increased in proportion to the intensity of the complication.

6th. Coloboma of the iris (artificial) does not influence penetration of fluids into the anterior chamber or into the vitreous.

7th. Increase of intra-ocular tension, even though slight in amount, is accompanied with a diminution of diffusion; this explains the slight effect of myoptics in the acute forms of glaucoma.

8th. The influence of temperature on diffusion has not as yet been sufficiently studied. The increase of diffusion from the influence of warm water applied to the eye is explained by changes in the superficial layer of corneal epithelium.

9th. Fluoresceine, acting on the eye for twenty minutes, does not reach the vitreous either in the normal or the pathological eye if the lens is preserved; but where the lens is lacking, the diffusion current reaches the vitreous.

10th. The lens tissue, combined with two layers of capsule, the intact zonula, and the hyaloid membrane, present a strong obstacle to the penetration of fluids from the anterior chamber into the vitreous.

II.—Should Capsulotomy Be Performed in Cataract Extraction? by Dr. VOLKOFF.

The author operates without iridectomy and without capsulotomy. The section, entirely corneal, passes a little above the border of the non-dilated pupil, or rather a little lower in the upper third of the pupillary region. The lens is extracted by compression, as in the ordinary operation, but as the capsule is complete, pressure should be more prolonged and greater. In 303 operations spontaneous rupture of the capsule occurred 48 times, particularly in young subjects; there was prolapse of the vitreous 96 times (31.7 per cent); in 102 cases the operation was followed by complications (simple traumatic iritis, irido-cyclitis, etc.); suppuration of the cornea and panophthalmitis occurred 8 times; in 72 cases there were adhesions established between the iris and the borders of the corneal wound; twice abundant hemorrhages occurred.

From the result obtained, the author concludes that capsulotomy is superfluous (!).

III.—Traumatic Corneal Astigmatism Following Extraction of the Lens, by Dr. DOLGANOFF.

The author has investigated 20 cases operated upon by the von Graefe method, with the aid of the Javal-Schioetz ophthalmometer; the patients were examined both before and after operation. The

first post-operative examination was made from nine till fifteen days after the operation; the last, when the astigmatism had become stationary.

The degree of post-operative astigmatism varied at the first examination between 2 D. and 8 D., and diminished progressively to about half the amount found at the first examination. The degree of astigmatism was less influenced by flattening of the cornea in a sense perpendicular to the direction of the section than by increase of its convexity parallel to the section.

The astigmatism in complicated wounds was considerably greater than the usual traumatic astigmatism. In cases of normal progress, retraction of the corneal cicatrix continues for from one and a half to two months, and it is only after this lapse of time that the traumatic astigmatism becomes stationary. The author considers that traumatic astigmatism is the result of the combined action of permanent tonic contraction of the eye muscles on the one hand, and the intra-ocular tension on the other.

IV.—Trachoma among the Foreign Population of the Village of Staryj-Slavkine, by Dr. KOUCHEFF.

V.—A Case of Amaurosis Due to a Gumma at the Base of the Brain, by Mme. SEREBRENNIKOFF.

November and December.

I.—The Pathological Anatomy of Congenital Leucomas of the Cornea, by Dr. TEPLACHINE.

The author has examined microscopically the eyes of the newborn at term, affected with congenital leucoma of the cornea. He formulates the results as follows:

Congenital leucomas of the cornea in both eyes of a child are of inflammatory origin, and result from intra-uterine pathological changes in the cornea; they are accompanied with inflammatory lesions of other portions of the eye. In one case a corneal leucoma of the right eye was due to diffuse interstitial keratitis, that of the left eye to corneal changes described under the name: Keratitis von der hinteren Hornhautwand ausgehend (Fuchs). The lesions of inflammatory character found in the cornea of the right eye and in other portions of both eyes were attributed to hereditary syphilis.

II.—Amblyopia Due to Anopsia, by Dr. SEGAL.

The author says that amblyopia caused by anopsia cannot de-

velop until there is complete suppression of access of light to the eye.

III.—Coleboma of the Optic Nerve, by Dr. TARNOVSKI.

IV.—A Case of Spontaneous Recovery of Detachment of the Retina, by Dr. GURFINKEL.

The American Journal of Ophthalmology.

Reviewed by Dr. SULZER.

August, 1894.

I.—A Case of Unilateral Facial and Orbital Edema and Exophthalmus of Nephritic Origin, by Dr. L. R. CULBERTSON.

A patient twenty-two years old had an enormous œdema of the lids of the left eye, which extended from the median line of the nose to the ear and downward to the upper teeth. Under the ophthalmoscope the papilla was seen to be light, the veins large, and the arteries contracted. Examination of the urine with picric acid revealed the presence of sugar. The author concludes that the existence of the orbital and facial œdema was due to a passing attack of acute nephritis in a diabetic and syphilitic patient.

September.

I.—Lid Pressure as a Cause of Astigmatism, by Dr. HOWE.

Painters are in the habit of pressing the lids strongly together in looking at a canvas placed a few yards distant, to obtain, in this way, the effect of distance. The pressure of the lids on the cornea during this act of clinching produces a certain degree of astigmatism. Can this astigmatism become permanent? Roosa has found in 200 normal eyes an average astigmatism of 0.67 D. Among 33 artists, the average found by the author is 0.905 D. The element of time in the production of astigmatism by lid pressure is an important one. I am quite sure that those who have been accustomed to pinch the lids together for a considerable number of years have almost without exception produced an irregularity in the form of the cornea.

II.—Albuminuric Retinitis, by Dr. HOBBY.

Two cases without peculiarities.

October.

I.—A Case of Quadrisectional Homonymous Hemianopsia, by Dr. WEYMANN.

A man became paralytic after an apoplectic attack, preceded by severe headaches. Large doses of iodide of potassium improved the paralytic symptoms, but had no influence on vision, which was reduced to $\frac{2}{8}$ on both sides. With the perimeter two symmetrical disposed scotomata were found in both eyes. In the left eye they included the upper external and the lower internal sectors, in the right eye the upper internal and the lower external sectors.

II.—A Case of Neuro-paralytic Keratitis from Injury to the Temporal Bone, by Dr. CULBERTSON.

November.

I.—A Case of Gumma of the Sclerotic, by Dr. J. J. KYLE.

The appearance of a small scleral gumma, situated quite near the corneal limbus above, had been preceded by a gummous iritis.

II.—Present Status of Asthenopia, by Dr. F. BULLER.

While recognizing errors of refraction as the most frequent cause of asthenopia, the author considers that disturbances of the external and internal recti muscles may frequently produce this condition. He does not agree with the opinion that disturbances of muscular equilibrium always disappear on correcting the errors of refraction which accompany them, and cites the existence in emmetropes of asthenopia characterized by muscular disturbances.

A separate group is composed of cases in which there is a decided weakness of accommodation. Reflex asthenopia should also be mentioned, and purely nervous asthenopia, frequently symptomatic of neurasthenia.

December.

Contains no original article.

IV.—BOOK NOTICES

BOOKS AND THESES

Recueil des cachets d'oculistes romains, by CAPTAIN EMILE ESPÉRANDIEU. (*Leroux, ed. Paris.*)

It has probably never happened to the *Annales d'Oculistique* to account to its readers for works published by captains in the French army. To-day we break away from our traditions and present a remarkable work, of which Captain Emile Espérandieu is the author. One of the most distinguished epigraphists of France, he has devoted his leisure hours to a study which is of interest to our readers, and has published a compilation of the seals of Roman oculists. It was in the *Annales* that Sichel, in 1866, published his *Nouveau recueil des pierres sigillaires d'oculistes*, and since then, at various times, articles relating to this question of medical history have found a place in the *Annales*. It is quite natural that Captain Espérandieu's work should here find the recognition which it deserves. Klein, in his enthusiasm, thinks that no antique relics are of such value as the seals of oculists; doubtless, he goes too far, yet one may judge of their value by the number and importance of writings on the subject. More than 200 publications have appeared on the subject of these little relics in the various countries of Europe. At the time when Sichel wrote his new compilation, scarcely 100 seals had been studied. Since then, the interest which they excited has only increased; none of them have been lost to science. Their list has continued to increase, and to-day almost 200 are known. There is an extensive literature relative to oculists' seals scattered through periodical publications, books, and pamphlets written in every language. Of these books and publications, some relate to the discovery of new seals; others have a more general character, and contain the history of all the signet stones known up to the time of their publication. But these have soon gone out of date, for many seals have been discovered since Sichel (1866), Grotefend (1867), Klein (1874), and Heron de Villefosse and Thédénat (1882) wrote their important works on the subject. All these publications, which at the time they appeared were properly supposed to be complete, are to-day behind the times, and the seals of Roman oculists awaited a new historian. Captain Emile Espérandieu did not shrink from the

difficulties of this task, and he possessed, in truth, the knowledge necessary to accomplish it brilliantly. For two years past a series of studies on the seals of oculists from his pen have appeared in the *Revue archéologique de Paris*. He now combines these various fragments in one volume.

All known seals have a place in it ; a special chapter is devoted to seals which have not been described until now ; another to the flasks for collyria ; finally, the author briefly describes the tablets on which oculists made their ointments and collyria. As is indicated by the title, the essential part of the work relates to the study of the seals. The author classes them in the alphabetical order of the places where they were discovered ; he indicates in what locality they are now to be found, and in what museums the originals, models, or imprints may be found.

He gives the dimensions of each of them, and tells the substance from which it was made. A bibliographic notice of the articles published, describing them, is added. This new classification and the accompanying information is of a kind to make the studies and investigations of those who are interested in oculists' seals very easy. The inscriptions engraved on the surfaces of the seals are faithfully reproduced in their abbreviations, and then the completed inscription is given. The author enters into no discussion or interpretation of the text ; he reproduces them exactly according to the version adopted by commentators, unless he sees fit to modify them from his own studies. The majority of these inscriptions have been verified from imprints or models, and frequently, also, from the originals. It is hardly necessary to mention the care and time spent in accomplishing such a work, which comprises the study of more than 200 signet stones scattered through a large number of museums of Europe, and the value which should be attached to this compilation, the details of which have been verified from the originals, or authentic reproductions, such as models, imprints, or photographs.

A chapter follows devoted to the study of the little flasks intended to contain collyria ; I have a dozen of these, found at Athens, Catania, Cumes, in Egypt, in Hungary, Tarenta, Toul, and Saint-Remy. The number is quite insufficient to definitely trace their history.

Then follows an interesting chapter on the tablets which oculists employed to prepare their ointments and collyria. It would have been interesting to us if the author had given more attention to this portion of his work and had been less sparing of his erudition. But

we cannot reproach him on this head. The title of his book promises us a compilation of Roman oculists' seals, and not of their tablets; hence, in adding the collyrium flasks and the tablets, the author has given more than he promised.

Captain Espérandieu then classes in alphabetical order all the collyria the names of which are known from the seals; with each collyrium is given the name of former authors who have described them, and in which of their works, the name of the place where the seal was found is given, and to which number of the compilation this seal corresponds.

Then in the same alphabetical order the names of all the Roman oculists are given, with the seals which relate to them, and the number in the compilation to which they correspond. We then read a series of names of Roman oculists who are known, not by seals, but by inscriptions, the locality of which is indicated, as well as the names of the authors who have written on this subject.

In the following chapter we find the names of the ocular diseases for which the collyria were applied; then the names of the towns where the seals were found, and their number in the compilation.

In the last chapter the seals are classified in the chronological order of their discovery, with the corresponding numbers in the collections of Tochon, Sichel, Grotefend, Klein, H. de Villefosse, and Thédenat, and that of the author.

Finally, the book closes with a complete list of all the works, and they are very numerous, published on oculists' seals, from Jean Smet (1678) to the present time.

Nothing so complete has been written on the subject of oculists' seals. Captain Espérandieu's book is the synthesis of all that has appeared on the subject; it is the conclusion of all the dissertations and discussions which have arisen concerning these relics, which recall a brilliant page of ophthalmology in the most flourishing days of the Roman Empire. This work is proof of the author's erudition, which was well known to us, but it appears in a more interesting form than that of similar writings preceding it. His conciseness, and the various classifications in alphabetical order of the localities where the seals were found, of the collyria, of the diseases for which they were used, and the names of the oculists, I am sure, will render investigations easy and rapid. The former bibliography is an interesting innovation in this kind of publication, but it must have necessitated long and careful research on the part of the author. Captain Espérandieu's book is not only a learned work, but is essen-

tially practical, and will be of real service to those who are interested in the history of ophthalmology.—PROFESSOR DENEFFE.

Les ophtalmies du nouveau-né, by Dr. E. VALUDE.
(Paris, 1896, Rueff et Cie, publishers.)

This book appears in the Charcot-Debove medical library.

The author divides it into two parts. In the first, he describes ophthalmia of the new-born, purulent ophthalmia, catarrhal conjunctivitis, catarrhal conjunctivitis of premature children, conjunctivitis with false membranes, and ocular diphtheria; in the second part he describes the sequellæ of ophthalmia. Since bacteriology has in a large part removed the obscurity with which the pathogenesis of ophthalmia was surrounded ocular therapeutics has made a great advance.

The author, while giving the results of his personal experience, reviews in a simple and clear fashion the contemporary researches on the various questions, and his great merit lies in producing an essentially practical book.

In the second chapter, devoted to the sequellæ of ophthalmia, he successively considers lesions of the cornea (opacities, complicated opacities, staphylomata, atrophy of the cornea and of the eyeball), lesions of the conjunctiva (retraction of the conjunctiva, symblepharon), lesions of the lids (entropion of the upper lid, entropion of the lower lid). Particular attention is given to therapeutics.—VAN DEN BERGH.

Traité pratique des maladies des yeux, by Dr. E. MEYER.
(4th edition, with 806 pages and 261 illus. Masson, ed., 1896.)

The fourth edition of Dr. E. Meyer's practical treatise is about to appear. There is no occasion for reviewing this book, which is in the hands of all. It is enough to say that this edition contains an account of everything new which has recently been published in ophthalmology, and that by rejecting all which has become useless, as the author announces in his preface, he has found room for all that recent works have produced of practical utility or scientific interest.—VALUDE.

Embryogénie et anatomie comparée de l'angle de la chambre antérieure chez le poulet et chez l'homme (*Comparative Embryology and Anatomy of the Angle of the Anterior Chamber in the Chicken and in Man*), by Dr. GABRIELIDES.
(Paris Thesis, Steinheil, 1895.)

From the author's investigations, the following conclusions are reached :

The ligamentum pectinatum has its ontogenesis; it persists always in the chicken, while it disappears in man about the end of embryonic life; the place which it occupied remains empty, and forms part of the anterior chamber, forming the angle of this chamber.

The posterior wall of the canal Schlemm is continuous with the corneal endothelium in man and in the chicken.

The ciliary muscle of the chicken is formed of two parts, an anterior and a posterior. In man there is, as a rule, only one part corresponding to the posterior portion of that of the chicken. While in the chicken this posterior portion is inserted in the canal of Schlemm, in man the muscle is fixed to the summit of the angle of the anterior chamber.

The so-called Henle layer of the iris does not exist in the chicken in the sense that it is represented by the fine radiating and striated fibres of the dilator muscle. In man, the layer to which the majority of authors give this name is the dilator muscle of the pupil, which is single and corresponds to the preceding radiating fibres.—
VALUDE.

MEDICAL JOURNALS

Treatment of Epilepsy by Tenotomy of the Ocular Muscles, by Dr. Wood. (*New York Medical Jour.*, July 7 and 14, 1894.)

Heterophoria is met with in some form, latent or manifest, in more than 95% of individuals.

Alone, or associated with ametropia, it is a frequent cause of the clinical symptoms called asthenopia. Correction of the errors of refraction in the majority of cases causes the muscular symptoms to disappear. It is then pseudo-heterophoria.

In cases where the symptoms persist after optical correction, there is true heterophoria, which is the direct cause of asthenopia.

In cases in which epilepsy is to be attributed to lack of ocular equilibrium, other symptoms of the latter are not wanting.

Before interference with the muscles, refractive errors should be corrected and the results awaited.

It is true that some cases of epilepsy are cured by muscular treatment in cases where there is true heterophoria.

Anomalies of the muscles alone may indeed produce epilepsy by acting as a reflex irritant, on account of the great disturbance which

lack of muscular equilibrium causes in the important function of binocular vision.

It is true, also, that cases of epilepsy have been cured by an operation on the eye muscles, although no ocular symptom could be given as immediate cause of the disease. These successes belong to the class of results obtained by operative suggestion. In the last century similar results were obtained by tracheotomy, setons, ligature of vertebral arteries, trepanning, oöphorrectomy, circumcision, castration, the actual cautery, resection of cicatrices, etc.

According to the author, when in a case of epilepsy there is manifest heterophoria which gives rise to the ocular symptoms known as eye-strain, it is proper to have recourse to a tenotomy, though it may be only a means of acting upon the imagination of the patient. In this connection the author recommends an inoffensive method advised by Reynolds, and which consists in removing, from time to time, a piece of skin from different regions of the patient's body.—VAN DEN BERGH.

Contribution to the Study of the Crossing of the Optic Fibres in Man, by Dr. HOSCH. (*Corresp. bl. für Schweizer Aerzte*, 1894.)

Dr. Hosch reports several new facts in favor of partial crossing.

In a woman who died at the age of seventy, the optic nerve of the right eye, which had been blind for four years, was found thinner than that of the other. A series of sections of the optic nerves and of the chiasm, prepared by the Weigert-Pal method, revealed the following facts: the right optic nerve was completely atrophied, and contained no nervous fibres; the left optic nerve was normal. Near the chiasm in the transverse section several nervous fibres were seen almost parallel to the direction of the sections situated at the lower border of the right optic nerve, while nearly all the fibres of the left optic nerve were cut transversely. In the chiasm the non-atrophied portion from the right side became larger and larger as the sections went backward. It was easy to prove that the normal fibres came from the left optic nerve. They were situated in the basal portion of the chiasm. In the posterior parts of the chiasm an atrophied bundle from the left side could be found situated in the basal portion. Its extent increased in proportion to the increase of the normal portion from the right side. From this exchange of fibres the left band was thinner at its origin than the right band, but it preserved the same quantity of normal fibres to its cerebral insertion. The proportion of normal fibres of the left optic nerve which passed into the right band was about two-thirds.

Dr. Hosch draws the following conclusions :

1st. Each optic nerve sends fibres to both bands.

2d. The crossed bundle is larger than the direct bundle.

3d. The direct fibres do not form a compact bundle in the bands.

Immediately behind the chiasm there is situated in the median line, forming in transverse sections, a wedge-shaped figure. From there they traverse the crossed fibres to take their place on the lateral side of the band. The crossed bundle is situated on the median and basal side of the bands.

The same disposition of the optic nerve fibres was found in the second case. A girl who died of phthisis at the age of nineteen had lost the left eye when she was five years old.

The proportion and localization of the atrophied portions and of the normal portions were identical with the case described.

In a third case (a man who died at the age of thirty-seven, who had lost his right eye when he was twelve years old) Dr. Hosch used the Marchi method for staining. Serial sections again showed the same disposition of the crossed and direct fibres, but the differentiation was not so easy to make as with the Pal method.—SULZER.

Treatment of Detachment of the Retina, by Dr. STEDMAN BULL.
(*New York Med. Jour.*, Sept. 1 and 8, 1894.)

Conclusions based on 38 cases.

The former method of treatment—repose in bed in the dorsal position, atropine, a compressed bandage, and the proper medication to provoke reabsorption of the extravasated fluid—remains decidedly the best method of treatment.

The continued use of pilocarpine, by the mouth or in hypodermic injections, causes much prostration even in cases where this medication is well supported. Quite as good an effect, if there is any effect, is obtained by the use of bicarbonate of soda, or of iodide of potassium in very dilute solution.

In recent cases, sub-conjunctival scleral puncture produced momentary improvement, but it did not last.

If there are bands through the vitreous, puncture produces no result.

Division of these bands may stop the progress of the detachment. However, this should not be done when the bands are vascular, on account of the danger from hemorrhage.

Operative treatment should never be employed when the eye is in a condition of inflammatory irritation.

Scholer's method should be abandoned. In fact, passing improvement and frequently no result is all that follows therapeutic or operative intervention in detachment of the retina.—VAN DEN BERGH.

Convergent Strabismus, by Dr. VALK.
(*New York Med. Jour.*, November 24, 1894.)

In relation to treatment, the author distinguishes two classes of cases.

When one of the eyes is amblyopic from birth, parallelism of the visual lines is not stimulated by the need of simple vision, and the internal rectus, four times stronger than the external, draws the eye inward.

The condition of refraction is here secondary. These cases will be relieved by operation.

In the other category the author classes eyes which formerly had normal vision, but were hypermetropic where the deviation was due, according to the classical theory, to an exaggerated need of accommodation, which was only obtained by an exaggerated convergence.

Cases of this kind recover without operation by the simple correction of refractive errors.—VAN DEN BERGH.

Scopolamine, by Dr. HARVEY SMITH.
(*New York Med. Jour.*, July 21, 1894.)

In solutions of from $\frac{1}{4}$ to $\frac{1}{10}\%$, toxic effects are easily produced, but they may be avoided by closing the lachrymal canal during the instillations.

Scopolamine has a therapeutic value equal to that of atropine.

Instilled drop by drop, it completely paralyzes the ciliary muscle and produces the maximum pupillary dilatation in twenty to thirty minutes. The effects last from five to eight days.

The superiority of scopolamine over other mydriatics rests in its rapid action.—VAN DEN BERGH.

Notes on 925 Cataract Extractions, by Dr. HIGGENS.
(*The Lancet*, August 11, 1894.)

In the last season the author has operated upon 74 cases, about half with and half without iridectomy. Iritis was less frequent in the operations without iridectomy than in the combined operations. There was one detail to be noticed: in cases where an iridectomy was made a thread was passed through a fold of the conjunctiva under the vertical diameter of the cornea. By means of this thread

in the hands of an assistant the eyeball was easily held down during the manœuvres for the excision of the iris.—VAN DEN BERGH.

Syphiloma of the Optic Chiasm Producing Bilateral Temporal Hemianopsia, by Dr. C. E. NAMMACK. (*Med. Rec.*, February 9.)

William P——, thirty-four years old, came to the hospital on February 20, 1894, complaining of violent occipital headache, which had lasted for twenty days, and which had progressively increased in intensity.

He had never had rheumatism. In October, 1889, he had contracted a chancre which was diagnosed as syphilitic. He was subjected to mercurial treatment. Six months later, P—— was found in a fainting condition in the bath-room, and remembered nothing that had happened for forty days. At the end of that time he was paralyzed on the right side. At the end of three months he was able to leave his bed. He was then subjected to mixed treatment until December, 1893; at that time the treatment was stopped. Four weeks later, the headache for which he came to the hospital made its appearance.

On examination, the pupil possessed photo-motor and motor-motor reflexes. Vision was normal. The visual field showed the presence of bilateral temporal hemianopsia.

The diagnosis made was that of gomme of the optic chiasm.

The treatment prescribed was the internal use of iodide of potassium and mercurial inunctions.

The effects were very rapid, and on November 18, 1894, the hemianopsia had completely disappeared.

This case is very interesting, as the hemiplegia occurred six months after the initial lesion, with energetic anti-syphilitic treatment. The case is rare, and is similar to that of H. C. Woods, who describes a case due to Schwartz, in which the hemiplegia made its appearance on the forty-sixth day after infection.—DE BOURGON.

Non-Cicatricial Ectropion with Treatment, by Dr. JOCQS.
(*La Clinique opht.*, Jan., 1895.)

The author, in case of mucous ectropion, advises making four deep vertical incisions with the thermo-cautery, and also Snelling's suture.

The lower end of the canterizations extends to the cul-de-sac and joins the section made by the Snelling suture, so that the first and the latter form a continuous system, and the cicatrix produced by

the Snelling suture will exercise traction on the lower extremity of the vertical cicatrices of the lid.—VALUDE.

Ichthyol as a Remedy for Several Ocular Affections, Principally for Ciliary Blepharitis, by Dr. F. RHO. (*Giorn. med. del 2.^o Esercito e della 2.^a Marina*, n° 9, 1894.)

Before Dr. Rho advised it, ichthyol had never been used in ocular therapeutics. He has used sulpho-ichthyolate of ammonia with lanoline in the proportion of 15%. In all stages of ciliary blepharitis the action was very rapid and curative.

In collyrium of 1½ or 2%, with distilled and sterilized water as excipient, ichthyol has always been perfectly supported, and has given the best results in catarrhal conjunctivitis.

In three cases of phlyctenular conjunctivitis the use of this collyrium was most efficacious.—DE BOURGON.

V.—MISCELLANY

CORRESPONDENCE

NANTES, March 11.

MY DEAR COLLEAGUE :

You have had the happy idea of submitting to a sort of plebiscitum a series of questions of present moment. I wish to propose to you two questions of clinical observation which seem to me to have some interest.

The first is in reference to nystagmus. What becomes of nystagmus in old age?

Here are my impressions on this point :

While it is of very rare occurrence, every specialist sees several cases each year, especially of the so-called horizontal form, and independent of any appreciable ocular lesion, contrary to the statements in the treatises.

There are three periods in life when recourse is had to the specialist for insufficient vision, without real disease of the eyes—the beginning of the school period, the age of conscription, and in old age.

In the first period the children are brought to us at the request of their school teacher, who thinks them myopic because they sweep their books with the nose.

If there is horizontal nystagmus, there is also noticed—the question of refraction being first determined, and generally there is only a hypermetropia common to the age found—a visual acuity invariably included between $\frac{3}{4}$ and $\frac{1}{2}$.

Convex glasses only magnify the image, and are frequently rejected.

At twenty years of age the number of cases of nystagmus is much less.

It is always supposed that there is objective integrity of the ocular apparatus.

Vision is generally somewhat superior, but I have never seen it exceed $\frac{1}{2}$.

Between forty-five and fifty I have only observed one case of horizontal nystagmus, and that was complicated with an independent lesion which rendered it impossible to determine the visual acuity.

What, then, has become of the cases of nystagmus in childhood and youth?

Do the muscular disturbances of the recti diminish as the patient grows older, like tics, until they disappear by a slow development of the centre of co-ordination, while at the same time the vision improves?

I have only seen a single example of rotatory nystagmus, much more rare, in an adult whose vision was normal.

What becomes of astigmatism in old age?

It seems to undergo an analogous modification.

It is extremely common in childhood and youth; I speak of the astigmatism which leads to asthenopia—that is to say, which exceeds 1.25 to 1.5 D.; thanks to the rapidity of determination with Javal's instrument, as many cylinders are now prescribed as convex or concave glasses.

But this frequency, from my personal experience, relates principally to cases of astigmatism of about 3 D. The light forms are much more common.

On the other hand, for how many old people do we prescribe cylinders? The number is extremely small.

It seems, then, that increasing rigidity of the eyeball as the years advance annuls the tendency to vertical flattening which is induced by pressure of the lids and the action of gravitation; astigmatism seems to disappear as the years advance.

Very cordially yours,

DIANOUX.

We have received, in connection with Dr. Pansier's article, the second part of which appears in this number (see above), the following letter from Dr. Gosetti (Venice), and insert the most important parts of it.

VENICE, April 2, 1895.

DEAR AND HONORED COLLEAGUE:—I have just read in the January number of *Annales d'Oculistique* a memoir by Dr. Pansier on the history of artificial eyes.

Passing over the very interesting facts which the author describes concerning the ocular prosthesis among the ancients, I stop at a passage in his article in which, after mentioning how for a long time Venice had the monopoly of the glass fabrication, and how for many

years artificial eyes made in this city were in vogue, he quotes from Rittérich, who, in his work, which appeared in 1852, relates, *à propos* of the former renown of Venetian artificial eyes, how he tried to obtain directly some examples of Venetian manufacture: "The eyes that I have had sent from Venice," said he, "are of glass, and are for use only in wax-figures. However, one of my patients reported to me a successfully made copy, but he died suddenly before giving me the address of the manufacturer."

Dr. Pansier, after this quotation from Rittérich, mentions the works of Mauchart, Hazard-Mirault, and Desjardins *père et fils*, and coming to the present epoch, only mentions the work, more commercial than scientific, of Boissonneau. Not a word of the present manufactories of enamel eyes in Venice! I think that this slight is unmerited, and to vindicate perhaps a priority, and in any case a title of honor for an old family of Venetian glass workers, I beg, my dear colleague, to address these few lines to you.

Near the end of the eighteenth century, Louis Rubbi, one of a very old family of glass workers, had at Borbiago, a small village in the province of Venice, a manufactory of objects in glass. There, after many attempts, he succeeded in making an artificial eye in enamel, which he afterwards perfected, always keeping to himself the secret of its composition.

Before he died, he confided the secret to his nephew, Vincent Rubbi, who, in his turn, improved the process of manufacture of his uncle, and until the middle of our century was the only maker of artificial eyes in Venice and in all Italy. There is no doubt, then, that the eye bought in Venice by the patient of whom Dr. Rittérich speaks, and who died before giving the scientist the address of his manufacturer, came from the house of Vincent Rubbi.

Laurent Rubbi, the eldest son of Vincent, still further perfected the paternal industry, and to-day he makes really perfect artificial eyes, which will bear comparison with the best similar products from France and Germany.

At the International Ophthalmological Congress held at Milan in 1881 Mr. Rubbi exhibited a collection of artificial eyes which were much appreciated and received the highest praise from the oculists at the Congress. Some of the models of the eyes exhibited had on the borders special notches for adaptation to projections of conjunctival bridges which may exist in greater or less number in the orbit.

Yours etc.,

FRANÇOIS GOSETTI.

VI.—ITEMS.

Necrology.—Dr. Hulke, London.

ANNALES D'OCULISTIQUE

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

POSTERIOR SCLEROTOMY AND SCLERECTOMY IN GLAUCOMA

By Dr. **H. PARINAUD.**

In a communication to the Ophthalmological Society in 1885 I pointed out the utility of scleral punctures with a von Græfe knife in glaucoma, punctures which have received since the name of posterior sclerotomy.

In that article I stated that since 1830 paracenteses, either of the cornea or of the sclera, had been performed in glaucoma by Mackenzie and Midlemore (1); that Desmarres, who had also employed them to relieve the pain, had observed that sometimes the disease was arrested for a long time. I also stated that in 1876 Le Fort described to the Surgical Society two cases of glaucoma which had been cured by sclero-conjunctival paracentesis, but I doubt very much whether posterior sclerotomy, as it is practised to-day, would be called in France the operation of Le Fort, as Dr. Parent stated to our foreign colleagues at the Edinburgh Congress.

(1) In an interesting monograph which Dr. Albert Terson has just published on *Pellier de Quengay* I find that punctures of the cornea and of the sclera had already been performed by French oculists of the eighteenth century in hydrophy of the eye.

The operation which Le Fort twice performed consists in introducing a cataract needle obliquely into the sclera, so as to give exit to the fluid which this surgeon supposed existed between the sclera and the choroid. He said that glaucoma was produced by this effusion, and, with much assurance, states that oculists have been the victims of an illusion in believing in an excavation of the papilla in glaucoma. It is this pressing in of the choroid by the extravasated liquid which simulates excavation of the papilla. As a proof of the justice of his theoretical ideas, Le Fort describes two cases which were treated by this assumed evacuation of the sub-choroidal fluid. But, outside of the relief which may be obtained from any puncture whatever, it is not certain, from the symptoms described, that this was glaucoma, as Giraud-Teulon and Perrin have stated.

Thus, the operation of Le Fort consists in introducing a cataract needle obliquely into the sclera to penetrate between this membrane and the choroid. I do not think that in France or anywhere else this operation is now practised.

The recent article of Mr. Priestley-Smith at the Edinburgh Congress on posterior sclerotomy leads me to resume this question and to communicate the results of my experience.

I described the operation in 1885, in the following manner:

“The operation may be performed without lid elevator and without fixation of the eyeball. A von Græfe knife is the only instrument necessary. The puncture is preferably made between the external and inferior recti muscles, eight or ten millimetres from the cornea. The eye being strongly turned upward and inward, the knife is plunged into the sclera, the point directed toward the centre of the eyeball, to a depth of from four to six millimetres. After leaving it a short time, I execute a quarter turn of the knife and draw it slowly out in slightly cutting the sclera perpendicularly to the first position of the blade, so as to obtain a triangular wound which favors persistence of filtration.” (*Bulletin de la Société franç. d'ophth.*, 1885, p. 279.)

For ten years I have performed posterior sclerotomy very many times in glaucoma with variable results. The principal cause of these differences rests, without doubt, in the individual peculiarities of the disease, peculiarities so numerous that it is very difficult to foresee how glaucoma will react under our knife whatever be the operation performed, for the distinction which has been attempted between malignant and hemorrhagic glaucoma and benign non-hemorrhagic glaucoma, although it may rest on true clinical observation, is nevertheless artificial. Realizing the uncertainty of our foresight, we should nevertheless endeavor to find for each operation the technique which will give us the best results. Theoretical views have been of no avail up to the present time in deciding between the different operations directed against glaucoma; it is better to rely on pure and simple facts.

Having replaced in my instrument boxes the old von Græfe knife by the much narrower one recommended by de Wecker for cataract operation, I noticed that posterior sclerotomy gave less satisfactory results. I finally decided that a too narrow knife was not satisfactory. On the cadaver the scleral opening made by simple puncture by such a knife is found with difficulty, but the principal inconvenience is that the second part of the operation, which consists in making a section perpendicular to the first, is performed with less accuracy. A too narrow blade may glide through the wound without cutting the sclera. A knife should be employed about two millimetres broad.

If the scleral wound should be sufficiently large, it would be, on the other hand, a serious error to think that the final result is in relation to the extent of the wound and the quantity of vitreous evacuated. Large wounds of the sclera with abundant issue of vitreous expose the eye to inflammatory reactions, to exaggeration of tension after cicatrization of the wound, and sometimes to phthisis of the eye. Ophthalmotomy should be reserved for cases where atrophy of the eyeball is desired.

The principal factor in the success of posterior sclerotomy is

the avoidance of all inflammatory reaction in the wound. I have become convinced that persistence of the opening made in the sclera may be obtained, cicatrization taking place in the conjunctival and episcleral tissue, without formation of cicatricial tissue in the sclera itself. I have arrived at this conclusion for three reasons : first, in two autopsies, in which, one month after in one case, and more than a year after in the other, I found the scleral wound not cicatrized, or at least capable of being re-established by a blunt probe; in the second place, by the establishment of a sub-conjunctival fistula, which is formed in some cases; finally, by what takes place in sclerectomy, of which I will presently speak, where the scleral opening, made in a certain manner, leaves the choroid visible at the bottom of the wound for a long time after the operation, and, as it seems, indefinitely. But this absence of cicatricial closure of the sclera is only obtained if all inflammatory reaction is avoided.

The following is observed immediately after the operation : the conjunctiva is ordinarily raised up by a small quantity of fluid. This swelling disappears the next day or the day after, the conjunctiva cicatrizes by first intention, and no further trace of the wound is found. In some cases the raising of the conjunctiva does not take place, there is no appearance of extravasation of fluid, and the traces of the operation are still less noticeable. In other patients, on the other hand, especially when the tension is very high and there is more or less abundant escape of the vitreous, there is formed on the days following the operation an inflammatory projection which might be considered as an ectasia of good augury. This is a mistake. These cases are the least favorable, doubtless because there is cicatricial obliteration of the scleral wound.

To avoid inflammatory reactions in the wound, ordinary antiseptic precautions should naturally be taken, in spite of the harmlessness of the operation itself, though I have never seen serious infection follow it. In the second place, one should endeavor to have a sub-conjunctival scleral wound. This result is generally obtained without special precautions, the conjunc-

tiva elevated by the fluid cicatrizing rapidly by first intention. For greater surety the conjunctiva may be displaced by forceps before making the puncture, so that the conjunctival and scleral wounds do not coincide.

I have said that posterior sclerotomy sometimes produces a blind sub-conjunctival fistula. This fistula is established the more easily in proportion as the puncture is made further back nearer the equator. The formation of this fistula is not to be desired in cases where the vision should be preserved. It is, on the other hand, favorable in absolute glaucoma. In a case in which this fistula had persisted for almost a year, puncture of the projecting vesicle formed under the conjunctiva with a von Græfe knife was followed by phthisis of the eye, without inflammatory reaction. The fistula may be closed with a galvano-cautery.

I think that in ordinary cases the most suitable situation to perform posterior sclerotomy is eight or ten millimetres from the cornea, as I stated in my first article. Nearer the cornea, the episcleral tissue, a prolongation from the capsule, becomes more and more compact, and the raising of the conjunctiva by the fluid, which favors non-cicatricial closure of the wound, is produced with difficulty. Further back, a fistula is more likely to follow the puncture, and if the production of this fistula is desired the puncture should be made at the equator.

One of the advantages of posterior sclerotomy is, then, the possibility of obtaining a more or less persistent scleral opening without cicatricial coaptation, the closure of the wound being made solely by the episcleral tissue. The advantages of such a wound will be appreciated from the point of view of filtration. Nevertheless, this filtration does not take place as easily as might be supposed, and it should be remembered that in the majority of cases the diminution of tension produced by posterior sclerotomy is transitory. But it is just here that ocular massage, recommended by Dianoux in all operations for glaucoma, renders the greatest service. It should be performed by the surgeon from the day after the operation, if there is no

manifest hypotonia, and from the third or fourth day in ordinary cases. These manœuvres will teach the patient to perform massage himself, which should be repeated three or four times a day for several minutes. In this way the good effects of posterior sclerotomy may be increased to a considerable extent.

This operation is evidently not intended to replace iridectomy, which remains our greatest resource against glaucoma, but, performed according to the principles which I have stated, it may render us valuable service, and forms a new weapon against the affection, of which we will never have too many.

It is indicated in non-irritating glaucoma of slow progress, where the advantage of iridectomy is doubtful. Repeated at longer or shorter intervals, and seconded by the action of myotics, it seems to me the best treatment in certain forms of chronic glaucoma.

In acute glaucoma, it is of great advantage to perform first posterior sclerotomy, the immediate effects of which on vision are remarkable, and the operative risk practically nothing. In some cases the disease is arrested for a longer or shorter time. In others, where iridectomy would be indicated, sclerotomy still has its usefulness; it informs us of the degree of malignity of the glaucoma, and finally, it renders iridectomy easier, and even less dangerous, in cases where there is effacement of the anterior chamber and excessive hardness of the eye. It is this fact which has led Priestley-Smith to systematically associate it with iridectomy. However, I do not think that the practice of this surgeon in performing the two operations simultaneously is likely to be adopted. In acute glaucoma, the hypotonia which immediately follows the operation is sometimes very great, and may for that reason render the performance of iridectomy difficult.

When iridectomy has failed, posterior sclerotomy may still be useful, and it has this advantage that it may be repeated several times. In malignant glaucoma, where vision is immediately lost, sclerotomy should be performed far back near

the equator, where there is more chance to have a fistulous condition established, thanks to which enucleation may be avoided.

Finally, one of the principal advantages of posterior sclerotomy is its great simplicity. Even before the introduction of cocaine, I frequently performed it without assistance, without fixation of the eyeball, and with a von Græfe knife as my only instrument. It can be performed by any physician who has once seen it, and for this reason it may render the greatest services in acute glaucoma until the patient can consult a competent oculist. Thus, Power has said that if he were attacked with glaucoma, and no experienced oculist were near him, he would ask to have posterior sclerotomy performed on him.

Sclerectomy.—This operation consists in removing a small portion of sclera, about three or four millimetres in size, so as to obtain a cup-like excavation which reaches to the choroid or near it. For this purpose, a fine chalazion hook is used, or better still, a needle with the shaft slightly curved at its extremity and a von Græfe knife. The lids being separated by an assistant, or with a blepharostat, the needle is plunged into the superficial layers of the sclera, which are elevated, and with the knife, the blade of which is parallel to the needle, a small flap is cut from this membrane. At the bottom of the wound the choroid appears, which is laid bare or is covered with a thin layer of scleral tissue, when the entire thickness of the sclera has not been cut. During the operation, or on the following days, according to the case, the operation is completed by plunging the point of the knife into the wound to give exit to the intra-ocular fluid.

I had formerly thought of this operation for detachment of the retina. I described it in 1884, stating that I had also twice performed it in glaucoma (*Bulletin de la Société franç. d'Ophtal.*, 1884, p. 77). Two years after (*Ophthalmological Society of the United Kingdom*, April, 1886), Spencer Watson performed an analogous operation under the name of trepanation of the sclera, in which, however, he cut the choroid with the sclera, which, in my opinion, should be avoided.

The aim of this operation, which I propose to call sclerectomy, is, it will be understood, to diminish the resistance of the sclera, to obtain a more efficacious filtration from the punctures, and, in certain cases, the formation of a staphyloma as a greater surety. To understand its utility, it should be stated that after the removal of the scleral flap closure of the wound may be obtained without cicatrization of the scleral opening, which is shown by the fact that a dark spot persists indefinitely at the bottom of the wound, which is the choroid seen through it. But to obtain this result certain precautions are necessary, and the principles which should guide us here are the same as for sclerotomy—that is to say, the least reaction possible should develop in the wound. This absence of inflammatory reaction and non-cicatrization of the sclera is easy to obtain in eyes with normal tension or slightly increased tension. It is more difficult to obtain in inflammatory glaucoma with high tension. It may, however, be realized by taking certain precautions which I shall describe.

Formerly, I excised the conjunctiva and the episcleral tissue with one cut of the scissors, in order to lay bare the sclera. This method is bad, because it is accompanied by too much inflammatory reaction. It is better to plunge the needle directly through the conjunctiva, and to remove with the same cut a small flap of conjunctiva and of sclera. The small opening made in the conjunctiva closes rapidly by first intention, and there is no tendency to the formation of cicatricial tissue in the sclera itself. For greater surety, one may, as in sclerotomy, displace the conjunctiva with forceps before using the needle, so that the conjunctival and scleral wounds do not correspond.

But this simple method can only be performed about seven or eight millimetres from the cornea. Further back the capsule is divided into several layers, contains cellular tissue in greater or less abundance, and the operation is no longer performed with surety unless the sclera is first laid bare; but instead of extensively denuding it, it is sufficient to make a

meridional longitudinal incision in the conjunctiva and the capsule, taking care to displace the conjunctiva with forceps before making the incision, so that the opening will not correspond with that of the scleral wound. Sclerectomy is very simply and easily performed at eight or ten millimetres from the cornea; it is, then, in this position that it should be practised, especially in glaucoma, where there is no indication to make it further back.

The other precautions to be taken are the following: the knife should not be plunged in too deeply, so as not to cut the choroid with the sclera. If this is done the inconvenience is not very serious, but with protrusion of the vitreous an inflammatory projection is almost invariably formed after the operation, and cicatricial tissue is formed in the wound. One should also endeavor not to cut through the entire thickness of the sclera; for this purpose the needle is only plunged into the superficial layers of the membrane. The cases where a thin layer of scleral tissue remains over the choroid are the most favorable.

Another question presents itself. Should the second portion of the operation, which consists in plunging the point of the knife through the bottom of the wound to give exit to the intra-ocular fluid, be performed immediately after the excision of the sclera, or on the following days? I ordinarily make the puncture during the operation, but in cases where the tension is excessive, to avoid abundant issue of the vitreous, and the inflammatory reaction which almost inevitably follows it, it is better, if the pains are not too severe, not to perform the puncture until three or four days after—that is to say, after cicatrization of the conjunctiva by first intention.

I have employed sclerotomy, especially in cases of malignant glaucoma, to avoid enucleation; but I think that it is also serviceable in chronic glaucoma of slow progress. When non-cicatrization of the sclera has been obtained the tension may be periodically diminished by punctures with a needle, which the patient, if necessary, may himself perform.

CLINICAL NOTES

ARTERIAL ANEURISM OF THE INTERNAL CAROTID
AT THE LEFT CAVERNOUS SINUS; COMMU-
NICATION WITH THE RIGHT SPHENOI-
DAL SINUS; NASAL HEMORRHAGES;
DEATH; AUTOPSY

By Dr. **GUIBERT**,

Late Interne of the Paris Hospitals.

In his thesis upon the intra-cranial hemorrhages of the internal carotid and its branches (1889), Dr. Gabriel Epron sums up what is known of the subject. Having had the opportunity of observing a very clear case of *arterial* aneurism of the internal carotid at the cavernous sinus, I have thought it a case worthy to be reported. It will be seen that the clinical symptomatology in nowise resembles that of arterio-venous aneurism, and that the diagnosis could only be established by the autopsy.

The 12th of last August I saw a young man who, in falling from a shock of sheaves upon a pitchfork, had lacerated his right eye. The prostration of the patient was far greater than is usual after such a lesion. The wounded man was brought on a mattress; he was pale, and seemed completely bewildered. Before even examining the injured eye, which was hidden under a bandage, the most striking thing was ptosis of the left eye. A careful examination showed that not only was the levator palpebræ paralyzed, but all the ocular muscles as well, without exception: ophthalmoplegia was complete. There was also mydriasis and paralysis of accommodation. Examination of the fundus revealed no lesion except a slight and indeed scarcely perceptible haze near the papilla. Arteries and veins were of normal calibre.

The right eye showed an extensive laceration of the sclerotic and of the cornea; the internal membranes, the choroid, and the iris, which were easily recognizable, were torn, and obstructed the wound. Sub-conjunctival infiltration had produced considerable chemosis in the inferior cul-de-sac. It being out of the question to preserve the eye, I decided upon enucleating it the next day.

The eighth day after operation the wound was completely healed; I ordered applications of the continuous current to the left eye, and gave two injections of strychnine on the temple upon two consecutive days, in order to hasten a cure of the left ophthalmoplegia.

The patient complained of heaviness in the head, and then of severe cephalalgia of the left side; abundant epistaxis followed. The attending physicians report that the blood gushed from both nostrils and from the mouth; the amount lost was collected and measured, and was over half a litre. It was of a bright red color. The patient became excessively pale, but as he was of a robust constitution, and taking plenty of nourishment, at the end of eight days there was no trace left of the hemorrhage. Nevertheless, from time to time he was subject to twinges of pain upon the left side of his head, the pains radiating to just behind the occiput, when suddenly, after a half-day of more than usually intense suffering, another hemorrhage almost as severe as the first occurred. The physicians noticed, during this attack, and the following ones, that the hemorrhage, at its onset and at its termination, came from the right nostril. It occurred so suddenly that its advent could not be foreseen; the stream was continuous, and about the size of a penholder; it stopped as suddenly as it began, so that the tampons and perchloride of iron, which have always since been applied, were only ready just as the hemorrhage was ceasing. The treatment then inaugurated consisted of daily injections of ergotine, the internal administration of the perchloride of iron, and tonics of every kind, to build up the patient's failing strength.

During the four months which intervened between the accident and his death he had ten hemorrhages, which so weakened and depressed him that he was unable to leave his bed. Three times he was overcome by syncope which simulated death but was of slight duration. During his last days he could scarcely manage to speak after the occurrence of a hemorrhage, and his pallor was cadaverous. On the following day he would have more animation, but a fresh hemorrhage would leave him in a weaker condition than the previous one.

At the end of a month the left eye, which up to that time had been completely paralyzed, began to make certain movements. At the end of three months motion was normal, ptosis having been the last to disappear. There was no mydriasis, vision was normal, and the fundus intact.

Auscultation of the right orbit by means of a stethoscope, which could be carried in deeply on account of enucleation

having been performed, revealed nothing more than the usual normal souffle. It was the same with auscultation of the left eye and temple. In short, there was nothing to authorize a diagnosis of aneurism.

As to the patient himself, in addition to the agonizing headaches from which he suffered, especially on the day of the hemorrhages and the day preceding them, his temper was whimsical, discontented, and restless. For several days he complained of radiating pains in the upper jaw, and also of deeper pains in the occipital region.

Death occurred in the fourth month, after hemorrhages upon three consecutive days. Twenty-four hours later I conducted the autopsy. After having sawed through the skull-cap with great care, I raised the dura mater on each side of the superior longitudinal sinus. The falx cerebri was incised at its insertion into the crista-galli, and carefully lifting up the right frontal lobe, and then the temporal lobe of the same side, I confess that I was surprised to find no lesion. Proceeding in the same manner on the left side, I found near the cavernous sinus a pinkish tumor lying in a depression of the anterior portion of the second temporo-occipital convolution (a lobule of the hippocampus). This tumor appeared to be about as thick as the little finger; situated upon the left side of the sella turcica, it filled the cavernous groove, and it filled and projected above and outside of the cavernous sinus. In the vicinity of the cerebral depression where it was situated there was no trace of meningeal exudation.

By means of a vertical section passing through the occipital foramen, and a horizontal section at the centre of the face, I detached the anatomical specimen, which I wished to examine at my leisure. I then tore away the dura mater from the frontal eminences to the anterior clinoid processes, and carefully rasping the sella turcica, I found upon the left side, at the upper internal portion of the cavernous groove, an ovular splinter of bone which was extremely slender and adherent to the dura mater. It was 3 millimetres long by 2 broad. Close to its lower extremity was a second splinter, smaller, more irregular in shape, and pointed. Continuing to separate the dura mater from the pinkish tumor situated beneath, I found that the adhesion was greater upon the external surface; finally I was able to throw back the dura through the foramen ovale and the foramen magnum. The aneurism was by that means completely exposed, and seemed twice as large as before the

dissection. It extended from the anterior clinoid process to the posterior clinoid process. Its loosely adherent anterior wall was easily lifted up from the subjacent bone ; not so the more adherent internal surface. Attempting to push it outward with the fingers, I was greatly surprised to find that I was pulling out a prolongation which extended into the sphenoidal sinus. This prolongation was only three millimetres long, and was terminated at its apex by an orifice the size of the head of a pin ; the edges were red, soaked, macerated, so to speak, in the blood. The orifice of the sphenoidal sinus which had admitted it was oval, and corresponded in shape very nearly to the splinter of bone found in the upper part of the aneurism, but was a trifle longer and broader.

From the posterior portion of this opening extended a line of fracture toward the sella turcica for a distance of about $\frac{3}{4}$ of an inch, from above upward and from without inward. The sphenoidal sinus, which was quite open to view, was full of clots which were continuous with clots in the right nostril and a portion of the right maxillary sinus.

I then made a section through the internal carotid as high as possible in the optic foramen, and as low as possible in the carotid canal. The tumor, when thus separated, seemed about the size of one's thumb. Its two extremities were formed by the normal calibre of the carotid, and on the internal surface was seen the prolongation with orifice already mentioned. Introducing the narrow blade of a pair of scissors into this orifice, I cut the internal wall of the aneurismal sac. It was almost wholly filled by clots which adhered closely to the external side, where they appeared as stratified masses, traversed by the yellowish-white lines of fibrin ; on the internal side they were not adherent, and occurred as a reddish pulp mixed with gray. There was not the slightest sign of laceration near the cavernous sinus ; in fact, the patient never showed any sign of arterio-venous aneurism, exophthalmus, pulsations, souffle, or thrill. The cavernous sinus was obliterated by the aneurismal dilatation of the internal carotid, which was lacerated upon its internal surface toward the sphenoidal sinus. The left wall of the latter was moreover excessively thin, and just below and behind the perforation, 3 or 4 millimetres from it, was a spot about the size of the head of a pin, which was transparent by artificial light. By means of a sound directed toward this spot, flexibility was noted—the slightest pressure would have caused a second perforation. It is a question whether this was a case of

wear, such as occurs near aneurisms, or whether the left wall was congenitally weaker than the right.

The various aspects of the interior of the sphenoidal sinus, divided into two unequal portions by a median wall, sometimes thrown to one side and sometimes to the other, have been described. This case was a good illustration of such descriptions, for if a colored fluid were injected through the orifice on the left side of the sphenoidal sinus—the orifice which admitted the aneurismal prolongation—it regularly made its exit through the right nostril, which explains why the hemorrhage always occurred upon that side, in spite of the fact that the aneurism was situated upon the opposite side.

Conclusions.—Arterial aneurism of the internal carotid at the level of the cavernous sinus may result from fracture by contrecoup of the base of the skull.

The lesion of the right eye, in the case under discussion, simply confused the diagnosis; it was produced by the pitchfork which lay upon the ground near the spot where the young man fell. Arterial aneurism of the internal carotid in the cavernous sinus is especially manifested by the phenomena of ocular paralysis upon the side where it is situated, which correspond to the pressure exerted upon the external wall of the sinus. This paralysis, as we have seen, may be non-continuous.

The small size of the aneurism and its deep situation account for the absence of stethoscopic signs. As there was no compression of the optic nerve situated higher up, the ophthalmoscope revealed nothing like what is met with in cases of arterio-venous aneurism.

To the causation of *total ophthalmoplegia* as known so far should be added arterial aneurism of the interior carotid in the cavernous sinus.

It seems to me that the diagnosis can be positively established only by the autopsy; death is apparently produced by nasal hemorrhage following rupture of the aneurism in the sphenoidal sinus.

TRAUMATIC PROLAPSE OF THE ORBITAL LACHRYMAL GLAND (1)

By Dr. G. HALTENHOFF.

Traumatic lesions of the lachrymal gland are extremely rare. The majority of classical authors are silent on this point. Desmarres (2) knew of no authentic case of isolated injury of this organ, except in operations on the orbit, where it is not very rare, but of no importance. This injury may complicate wounds from firearms, as in the case of Larrey, where the gland was extracted with a fragment of a ball which had lodged in it.

The case of the small boy which I present here may, then, be of some interest.

Last winter, at the age of two and a half years, this child fell forward in a road full of broken stones. He got up with a bleeding face, and could no longer open his right eye. The country physician was immediately called, and found the eye swollen, impossible to open, and on the lid a wound from which a solid bloody mass protruded. He applied a regular bandage, and thinking the case serious, brought the child to me. I saw him three days after the accident. The child had not suffered, but had not been able to open the eye. I found the upper lid falling over, cedematous, tense, and quite ecchymotic. In its external third, several millimetres above the free border, there was a sort of fleshy protruberance of a livid grayish-red color, and of a consistency which seemed too firm for a simple clot. I admit that at first sight I was somewhat alarmed at the appearance of this tumor, which seemed to resemble a retinal-choroidal prolapse, as it is sometimes seen in injuries of the globe. It adhered by a sort of pedicle to the bottom of a horizontal wound of the skin. The little fellow resisted so vigorously that I etherized him, introduced a Desmarres elevator, and then opened the palpebral fissure enough to prove the perfect integrity of the eyeball. This was, then, evidently, a hernia of the lachrymal gland. The sharp edge of a broken stone, or possibly a fragment of glass or pot-

(1) Communication to the Medical Society of Geneva, Session of February 5, 1895, with presentation of the patient.

(2) DESMARRÉS: *Traité théorique et pratique*. Paris, 1854, Vol. I., p. 262.

tery, had cut the lid while it was open, penetrated obliquely from below upward through its suspensory ligament, which protects the orbital portion of the gland, and dislocated it through the wound. The round, somewhat oval, form of the tumor, its thickness of five or six millimetres in the centre, its diameter of about twelve to fifteen millimetres, and its compact consistency corresponded, in fact, to this organ.

It seemed difficult to me to reinstate the protruded gland in its proper position; still more so as, after three days' strangulation, there was possible risk of its becoming gangrenous or of suppurating. So I profited by the narcosis to cut it off from the lid. I then noticed at the bottom of the wound several grayish-red lumps, apparently lobules of the gland. They belonged, without doubt, to the palpebral portion, which, as is known, is formed of a mass of little isolated lobules with quite loose connections. The wound was united with two silk sutures, dressed with dermatol, and closed by first intention, except a punctiform fistula, which some time afterwards gave issue to a trace of fluid clear as water, but which did not prevent it from closing. The swelling of the region took several weeks to disappear. The recovery was perfect, and the cicatrix was scarcely noticeable. No difference is noticed in the appearance of the two eyes.

I will add that a vertical section made immediately after removal revealed a lobulated structure, showing in the central portion a grayish arborescent design, the ramifying prolongations of which were lost toward the periphery. The diagnosis of an acinus gland was further confirmed by microscopical examination performed by Dr. Buscarlet.

I have only found three similar cases described in literature. The first case, observed by von Græfe (1), was that of a child who cut the lid in its entire length underneath the orbital border, by falling on a piece of glass. The protruding gland, as large as a phalanx of the finger, hung over the lid. Severe ecchymosis of the conjunctiva was accompanied by exophthalmus—that is to say, with intra-orbital hemorrhage. Von Græfe thinks that pressure of the extravasated blood contributed to the expulsion of the gland. He sutured the lid above after the gland had been returned to its place. A portion of the wound suppurated, and recovery required five weeks.

(1) *Archiv für Ophthalmol.*, XII, 2, 1866.

Twenty years after, Goldzieher (1) described a case quite similar to mine, of an injury from a piece of glass, and in which, as in my case, he performed ablation. A third case seems to have been noted by Panas in his lectures on the lachrymal apparatus (1887) (2).

Total or partial extirpation of the lachrymal glands, practised so frequently in late years to remedy incorrigible lachrymation, has proved that the integrity of this organ is not necessary to the eye. The cleaning of the cornea by the movements of the palpebral veils and the habitual lubrication of the ocular surface seem to be sufficiently assured by the secretion from the conjunctival glands, aided, perhaps, by a serous transudation from the entire mucous surface. Panas, furthermore, considers Krause's sub-conjunctival glands as forming part of the lachrymal apparatus. In my case, no difference is seen in the moistening of the two eyes. When the child weeps, both eyes weep alike. This fact may be brought forward in favor of de Wecker's theory, which is that emotional lachrymation proper to the human race is a function resting in the palpebral gland alone, which is lacking in the other mammals.

II.—REPORTS OF SOCIETIES

CONVENTIONS

FRENCH SOCIETY OF OPHTHALMOLOGY

Session held at Paris, May 6 to 9, 1896.

The Comparative Value of Objective Methods of Optometry.

DR. PARENT, *Reporter*.—Only a short time since, ocular refraction was determined in all the clinics of Paris almost exclusively by

(1) *Pester medic. chirurg. Presse*, 1876.

(2) PANAS: *Traité des maladies des yeux*, Vol. 2, p. 331.

the subjective method of Donders. The assistants or chiefs of clinics charged with this duty made no previous objective examination, and having no information as to the refraction of the eye under examination, they passed before this eye an incredible number of spherical or cylindrical glasses. I trust that so unscientific a method has ceased to exist, and that every one has recognized the great utility of objective methods of optometry. I will describe the principal ones, commencing with those founded upon ophthalmoscopic examination:

1. Apparent displacement of the vessels with the erect or inverted image in relation to the movements of the observer.
2. Parallax displacement of the inverted image in relation to the movement of the objective lens.
3. Variations in the size of the inverted image in spherical ametropia, and variations in the form of the image in astigmatic ametropia when the lens is moved away from the observed eye. Exact determination of the optometric remote point where the inverted image is situated.
4. The erect image.
5. Skiascopy.

APPARENT DISPLACEMENT OF THE VESSELS WITH THE ERECT OR INVERTED IMAGE IN RELATION TO THE MOVEMENTS OF THE OBSERVER.
—For the emmetropic observer placed at a distance D from the observed eye, the H eye, the E eye, and also the M eye, whose remote point $R > D$ produces for the observer an erect and virtual image which, perhaps clear with H, will be somewhat indistinct with E (because the observer accommodates slightly) and more indistinct with weak myopia. There will be no image in M where $R = D$; this is *the neutral point of observation where the remote point of the observed eye is coincident with the pupillary plane of the observer*. Finally, there will be a real and inverted image in M where $R < D$.

On the other hand, in the case of an erect and virtual image, the apparent displacement of the vessels takes place in the same sense as that of the observer, and the contrary occurs with the real and inverted image.

It should not be forgotten that the amplitude of the apparent displacement of the image is in inverse ratio to the degree of ametropia (H or M). The greater the ametropia, the less is this amplitude.

Furthermore, it will be possible to determine the nature of the ametropia. But the difference in the size of the virtual images and

the difference in amplitude for the same displacement of the observer does not permit of determination of the degree of hypermetropia. It can only be said that it is of small, medium, or high degree.

Another inconvenience of this method is that it necessitates a large pupil, in order that the vessels may be more easily seen, so that in the majority of cases recourse must be had to atropine or cocaine, which is inconvenient.

PARALLACTIC DISPLACEMENT OF THE INVERTED IMAGE IN RELATION TO THE MOVEMENT OF THE LENS.—In examining with the inverted image, if lateral movements are given to the lens at the time when the papilla is seen in the centre of lens, it will be noticed that the ophthalmoscopic image also moves. To facilitate this method of examination I would recommend tracing two cross lines on the lens with a diamond; the centre or the border of the papilla may then be made to coincide with the centre of the cross. In this way the relative movements of the image and the lens may be easily observed. These movements vary in amplitude according to the condition of refraction of the eye observed.

Let us designate the ophthalmoscopic image by I, the principal focus of the lens by F, the displacement of the optical centre of the lens by D' , and that of the image by D^i . We will then have:

E	I in F	$D^i = D'$
M	I inside of F	$D^i < D'$
H	I outside of F	$D^i > D'$

If now there is unequal refraction in the different meridians of the eye (an astigmatic eye), and the lens is made to move in different directions, it will be seen, by means of the difference in the relative movements of the image and the lens, which of the two meridians is E, H, or M. If the two principal meridians have the same ametropia in different degrees, the increase or decrease of the displacement of the image in relation to that of the lens will be more pronounced in one than in the other. Very slight excursions of the lens are enough to show this difference.

It is especially in a case of mixed astigmatism that this method gives an interesting result. If the vertical meridian is M, and the horizontal H, it will be seen that the image moves slower than the lens in the vertical direction, while it moves faster than the lens in the horizontal direction.

After experimenting with this method I have become convinced that with it any astigmatism equal to or superior to 1 D. may be diagnosed. But for this purpose, if the astigmatism is compound

hypermetropic or compound myopic, it is necessary first to correct one meridian by placing a lens in the trial frame. This meridian will be corrected when the image is displaced in the direction of the meridian as rapidly as the lens. It remains, then, to place in the trial frame a suitable cylinder which, in the perpendicular direction, will give to the image and the lens the same amplitude of displacement. Correcting glasses placed before the observed eye do not disturb examination with the inverted image.

This method is elegant, rapid, and quite exact. That it may be of practical use, it is necessary that the image should have a sufficient amplitude of displacement; a lens, then, of long focus must be used; for example, 12 D.

But with this method it is always to be feared that the observer will not hold his lens exactly perpendicular to the emergent rays, and will thus himself produce a certain amount of artificial or incidental astigmatism. This cause of error may be in part obviated by using lenses supplied with ball-and-socket joints, with which they are always vertical.

EXACT DETERMINATION OF THE REMOTE OPTOMETRIC POINT OR THE POSITION OF THE INVERTED IMAGE.—The objective lens placed before the observed eye gives it an artificial remote point, which we will call the ophthalmoscopic or optometric remote point. If F'' is the posterior focus of the lens, the ophthalmoscopic image of the observed eye will coincide with F'' (E), will be within it (M), or beyond it (H).

Whenever the observed eye acquires or loses an amount of refraction equal to 1 D. the ophthalmoscopic image is displaced by an amount equal to the square of the focus of the lens; it is displaced by this quantity beyond F'' if the observed eye is H, and by the same quantity within F'' if the observed eye is M.

In all ophthalmoscopic optometry with the inverted image, that it may be of practical value, the lenses should be without border and achromatic, and lenses of 14 and 20 D., on account of their short focus, should each be composed of four lenses, coupled two and two (flint and crown), each couple having a dioptric power of 7 and 10 D. This procures the double advantage of a large ophthalmoscopic field and purity of the image.

With a little practice this method permits a diagnosis of the different conditions of refraction to be made, and of all degrees of astigmatism superior to 2 D. But for this several conditions are necessary which are not always realized.

The first, and the most important, is that the pupil shall be sufficiently large.

Then, to appreciate more easily the variations of form, it is important to have a considerable enlargement, which can be obtained with a lens of 12 D. But then the field of observation diminishes, and for a slight departure from the special point where the focus of the lens coincides with the pupillary plane the image of the pupil will become rapidly smaller than that of the optic disc.

For these two reasons this method is only practical with pupils which are naturally large or which have been artificially dilated with atropine.

A third indispensable condition (if a fixed ophthalmoscope is not used) is that the lens should be held exactly perpendicular to the emergent rays from the observed eye, otherwise an artificial astigmatism will be produced which may increase or diminish that of the eye under examination. One is assured that the lens is perpendicular when the two reflections from the anterior and posterior surfaces coincide.

METHOD WITH THE ERECT IMAGE.—This method consists in finding the number of the lens which will give a clear image of the fundus of the eye to the observer, supposed to be E (or rendered so), and without accommodation. This lens, then, corrects the ametropia of the observed eye; it measures the degree of it for that special case.

There is always here a cause of error, which rests in the fact that the correcting glass is placed behind the mirror of the ophthalmoscope—that is to say, somewhat beyond the anterior focus of the eye. Its distance from the remote point will then be too small in myopia and too great in hypermetropia, and the same will be true of the focal length of the correcting glass.

This cause of error, which may be neglected for the low degrees of ametropia (1 to 4 D.), becomes important in the medium degrees (4 to 8 D.), and is very important in the high degrees (8 to 20 D.).

This source of error may be avoided by placing a lens (for example, + or - 5, 10, 15) in the trial frame, which in part corrects the high degree of ametropia and transforms it into a low degree, in which the error resulting from the non-coincidence of the correcting glass of the ophthalmoscope with the anterior focus of the observed eye may be neglected.

This method with the erect image, which I formerly recommended in publications which appeared in 1880 and 1881, is very easily ac-

quired. It is the only optometric method with the erect image applicable to all cases.

The *diagnosis* of astigmatism with the erect image rests upon two principal factors: the form of the disc and the difference in sharpness of the vessels. Its *measure* consists in clearly seeing the entire contour of the papilla (whatever may be its anatomical form, oval or round) and in clearly distinguishing the double contour of all the vessels, whatever may be their direction.

The change in the form of the papilla is dependent upon a difference in enlargement, and will be more pronounced the greater the enlargement. It therefore happens that in like degrees of astigmatism the change in form will be more marked in myopic than in hypermetropic astigmatism, because in the first case the eye performs the function of a stronger lens than in the second.

But this deformation of the optic disc is not the principal point of diagnosis. It should, of course, be taken into consideration, but *the most important factor is the difference in distinctness of the vessels*. It is this especially which must be carefully considered in diagnosing low degrees and determining exactly the correcting glass.

This determination is relatively easy with my ophthalmoscope, which, in addition to convex and concave spherical lenses, contains cylinders with which all varieties and degrees of astigmatism may be measured.

Whether the principal meridians are right or oblique is indifferent, since the ophthalmoscope permits of placing the axis of the cylinders in any direction.

Rules to be Observed in Optometry with the Erect Image.—I will briefly enumerate them:

1. It is of great importance to hold the correcting glass in the ophthalmoscope as near as possible to the anterior focus of the observed eye. The error arising from their non-coincidence is such that high degrees of ametropia are no longer measurable by this method: They must first be partially neutralized with a + or - glass to transform the high degree of ametropia into a low one, not exceeding 3 or 4 D.

2. If, whatever be the refraction of the observed eye, the same field of illumination on the retina is desired in all cases, the inequality of the optical axis of ametropic eyes (H or M) requires a difference in the incident rays, and consequently the use of several mirrors. With this aim in view, I had an ophthalmoscope constructed in 1883 which contains three mirrors—one plane and two concave—of 20 and 8 centimetres focus. If the luminous source is at a distance of 20 centimetres from the reflector, the plane mirror gives

divergent rays, the concave mirror of 20 centimetres focus almost parallel rays, and that of 8 convergent rays.

3. The opening in the reflector should measure about 3 millim. Perforated mirrors of silvered glass are generally bad. When they are not bevelled they cause a troublesome reflex, and when bevelled the opening is too large, as the bevel is made at the expense of the silvered or reflecting surface. With steel mirrors it is just the opposite, and they are usually good.

Instead of a central circular opening, the fundus of the eye may also be seen through multiple openings in the form of small circles or parallel slits, like the optometers of Scheiner (1619), or of Young (1801). These mirrors utilize half of the emergent light (hence, better illumination of the image) and facilitate exact focusing on the small vessels in the fundus of the eye; in particular, those which are directed from the disc to the macula.

4. To avoid incident astigmatism (which increases with the dioptric strength of the spherical or cylindrical lens employed and with its obliquity) the correcting glass should always be held perfectly perpendicular to the axis of the emergent rays from the eye observed. Therefore, *the mirror should always be oblique in relation to the plane of the ophthalmoscope*. This obliquity may vary according to the position of the luminous source. I should fix the limits at 25° as minimum and 45° as maximum. It should not reach 56° , unless one wishes, as did Helmholtz, to utilize the angle of polarization by reflection to diminish the corneal reflex.

5. The ophthalmoscope should contain a complete series of spherical and cylindrical lenses, as far as possible, without combinations, for the lower and medium numbers. Those lenses should have a diameter somewhat larger than the average diameter of the pupil.

As a specimen of an ophthalmoscope for refraction, I will describe the instrument which I had constructed in 1889. It contains 30 spherical lenses by half dioptries up to + or — 5, then by dioptries up to + or — 10. Two other spherical lenses, + or — 10, give combinations with the preceding up to + or — 20. It contains also 11 concave and 11 convex cylinders with opposite axes. The plate which supports the 3 little mirrors (1 plane and 2 concave) is movable. When it is removed the ophthalmoscope may serve as a subjective optometer, since it contains almost all the spherical and cylindrical lenses of the trial case.

OPTOMETRY BY SKIASCOPY.—The principle is as follows: Suppose the observer to be at a distance of 1 metre from the patient and the lamp near the latter. After reflection on the concave mirror, a portion of the rays penetrate into the observed eye, and form on the

retina an image of the luminous source. This image will be sharp or diffuse according to whether the observed eye is or is not in focus for the catoptric image. Now, if the concave mirror is made to rotate, the image of the luminous source on the retina of the observed eye is displaced in a direction contrary to that of the mirror.

On the other hand, with a plane mirror the image of the lamp on the retina is displaced in the same direction as the mirror. Therefore, the phenomena found in Cuignet's method of examination will be opposite if, for the same eye, a concave and plain mirror are successively employed. For greater simplicity in what follows we will suppose that a plane mirror is employed.

Suppose, first, that the mirror is plane, the observer at a distance of 1 metre from the observed eye, and the movements of the ocular illumination (or of the shadow which limits it) opposite to those of the mirror. We are then dealing with a real and inverted image of the illuminated portion of the retina; there is then myopia greater than 1 dioptré. The degree of this myopia may be determined by placing stronger and stronger negative lenses before the eye, until the ocular illumination moves in the same direction as the mirror. The image of the fundus of the eye has then become virtual and erect, and the myopia is almost corrected.

Suppose now that the movement of the shadow is in the same direction as that of the plane mirror; the image of the fundus of the eye is then virtual (H or M less than 1 D.). To differentiate these three cases proceed as follows:

1. With $+ 0.50$ the movement of the shadow becomes inverse; this shows that there was already M of at least 0.50.
2. With $+ 0.50$ the movement of the shadow remains direct, but with $+ 1$ D. it becomes inverse; the eye was E , or almost so.
3. With $+ 1$ D. the movement remains inverse; H surely. Stronger and stronger convex glasses are then put before the eye until the movement becomes inverse. This lens diminished by 1 D. (or $N - D$) gives almost the degree of H .

In fact, the method consists in finding with what lens (N) the remote point of the observed eye is at about 1 metre. N expresses, then, the degree of M and $N - 1$ the degree of H .

Intensity of the Shadow and Amplitude of Its Apparent Displacement.—A peculiarity to be noticed on account of its practical importance is that the shadow (which limits the illuminated portion and follows it when it changes place with the movements of the mirror) is deeper and moves more slowly in the higher degrees of ametropia.

The first of these two characteristics is due to the fact that the

image of the luminous source is more or less sharp or diffuse on the retina, according to the condition of refraction of the eye under examination. When the image is sharp, or nearly so, it partially illuminates the surrounding portions of the retina by reflection, and is only surrounded by a penumbra. The diffuse image, on the other hand, only slightly illuminates the adjacent portions of the retina, which are thus in a true shadow. The intensity of this shadow is proportionate to the diffusion of the image, and consequently to the degree of ametropia, if the mirror is plane—in fact, the reflector being at 1 metre, the luminous source is at 2 metres, and therefore the retinal image has its maximum sharpness at M of 0.50.

All this can be easily verified on examining with the erect image and with almost parallel rays an ametropic eye before which convex and concave glasses are successively placed.

As for the luminous intensity of the papilla, it is in inverse ratio to the diffusion of the retinal image.

The second characteristic (the more or less rapid movement of the shadow) is due to the fact that the amplitude of displacement of the image is smaller the greater the degree of ametropia. Whether there is a virtual image in a high degree of H , or a real image in a high degree of M , the phenomena will be the same.

Zone or Region of Poor Observation, and Neutral Point of Observation.—For M in which $R=D$ (1 metre in my description) there is no image possible, since then the retina of the observed eye is the conjugate of the centre of the pupil of the observer, and therefore the ophthalmoscopic visual field is reduced to a mathematical point; at least it may, without appreciable error, be thus described. This special place where no image is possible is the neutral point of observation.

Coincidence of the Pupillary Plane of the Observer with the Plane of the Remote Point of the Observed—that is to say, the neutral point of observation—is characterized by instantaneous illumination followed by instantaneous obscuration of the pupil of the observed eye.—I should, however, mention that this is only to be realized with an artificial eye supplied with a good achromatic lens well diaphragmed. With the eye, it will be otherwise, on account of spherical aberration, chromatism, lack of homogeneity of media, and a certain amount of physiological As . These defects combined render perfect homocentric refraction for the eye impossible, and we will not have with it a true neutral point of observation, because all the rays emanating from the illuminated portion of the retina do not unite in an image situated in the same plane, that of the pupil of the observer. The determination of the neutral point of observation (and therefore

of the remote point of the observed eye), though very easy in theory, will be much less so in practice. But for the observed who takes the precaution to keep himself at a good distance (for example, 1 metre), an error of even 10 centimetres in the fixation of the remote point is of no consequence, since it corresponds to only $\frac{1}{10}$ diopetre.

But if the observer is nearer, at 50, 33, 25, or 20 centimetres, where the remote point of M of 2, 3, 4, or 5 D. are respectively situated, the error increases very rapidly on approaching the observed eye, and if he goes still nearer, all exact determination of ametropia becomes impossible in high degrees of myopia, for an error of 2 centimetres, for example, in the fixation of the remote point with a metric ribbon will correspond to an error of 1 or more dioptries.

I have indicated above why the real fixation of the neutral point is so difficult. But it should also be said that for the observer placed a little within or without the remote point of the observed eye there is a true zone of poor observation (which I estimate at about 10 centimetres, if the shadow test is made at 1 metre, and which includes 5 centimetres within and 5 centimetres beyond the remote point). In fact, in all this zone the observer receives two divergent or two convergent rays. The phenomena of direct or inverse movement of the shadow is here indistinct, and becomes more indistinct as the divergence or convergence increases—that is to say, as the pupil of the observer approaches the remote point of the observed.

Astigmatism.—The simplest method of demonstrating the presence of As. by skiascopy is to find the position which gives an opposite play of the shadow in the two principal meridians—a play of the shadow characteristic or pathognomonic of As.

To determine the degree of As., the observer, still at a distance of 1 metre, should proceed as follows: Whatever be the variety of As., the least refractive meridian should first be made E with a concave or convex spherical glass, according to the method indicated above for H and M; the shadow then moves in the same direction as the mirror in this meridian, and in the opposite direction in the more refractive meridian. Concave cylinders of increasing strength, and with axis perpendicular to the more refractive meridian, should then be placed before the eye until the shadow becomes also direct in this meridian and has the same characters as in the other. A determination as exact as a quarter of a diopetre, as with the ophthalmometre of Javal, may thus be obtained.

It should, however, be stated that the determination of the principal meridians in total As. by means of ophthalmoscopic methods of

optometry is less exact than that obtained by the Javal and Schiøtz ophthalmometre in corneal As.

KERATOMETRY.—Dioptric systems with curved surfaces like the cornea and each surface of the lens produce two images: one by refraction or dioptrics, the other by reflection or catoptrics; the latter being identical with that of mirrors.

The size of the dioptric image depends upon the radius of curvature of the surface and the index of refraction of the medium. The size of the catoptric image depends only on the radius of curvature of the surface.

The index of refraction of the cornea being known ($=1.33$), its catoptric image may then serve to determine its dioptric power.

Kohlrausch, in 1839, used for this purpose an astronomical telescope. He placed in the focus of the ocular two hairs of spider's web parallel to each other, which he could, by a mechanical movement, approach one to the other without altering their parallelism. He made these two hairs coincide exactly with the corneal images from two planes placed on opposite sides of the telescope in the same horizontal plane, then, by means of a graduated scale substituted for the eye, he determined the distance between the reflected images. He thus calculated the radius of curvature of the cornea.

Senff, in 1846, employed almost the same method, but instead of flames he made use of two strips of paper fixed on a window. He found that the cornea was elliptical, measured the radius in different points of the same meridian, and calculated the axis and eccentricity of that meridian.

Cramer, in 1853, to examine the changes produced in the eye by accommodation, studied with a telescope the so-called Sanson or Purkinje images. He was thus able to establish the fact that during, as well as without, accommodation the catoptric image of the cornea remained constant in size, while that of the anterior surface of the lens diminished.

Helmholtz, in 1854, published a description of his ophthalmometre, an instrument based on the same principle as the heliometre invented by my compatriot, Bouguer, in the last century (1747)—that is to say, on the measurement of an image by its duplication. The ophthalmometre of Helmholtz possesses a great advantage: the small and inevitable movements of the head of the person examined, which, with the method of Kohlrausch and Senff, easily falsify the result, are of no consequence here, as the two images always move in the same manner, as in the heliometre, and their relative position does not change.

Doubling of the image may also be obtained by various methods: (a) by two plates of glass with parallel faces—one above, the other below—attached by their edge and not in the same plane (Helmholtz); (b) by two prisms superposed in contrary directions (Landolt), as in certain telemeters; and (c) by two portions of a lens, one above and the other below, and displaced laterally in relation to each other, as in astronomical heliometers; (d) by a double refracting prism of Iceland spar (Coccinus); (e) finally, by a Wollaston prism, which is composed of two rectangular prisms of quartz cut differently in the crystal and attached to each by their hypotenuses. The angle formed by the faces of each prism varies according to the doubling desired. Javal and Schiøtz in 1881 chose the Wollaston prism as a means of duplication in their ophthalmometre. This instrument has greatly simplified the measurement of the radius of curvature of the cornea. By means of it keratometry, which was formerly purely a laboratory experiment, has become truly practical. Furthermore, the great number of articles called forth by this instrument, both in Europe and in the United States, in the last fourteen years, show the importance of this invention.

RESULTS OF OPHTHALMOMETRY.—For the last fourteen years an ever-increasing number of observers have made corneal measurements. Their names are given in the *Memoirs of Ophthalmometry*, published by Javal. This book includes the principal results known in 1890. I will briefly enumerate them:

General Form of the Cornea.—The results of Leroy's measurements, made in 1889, are: First, the curvature of the median horizontal section of the cornea diminishes from the centre to the periphery, and diminishes about four times as much on the nasal side as on the temporal side; second, the curvature of the median vertical section of the cornea diminishes from the centre to the periphery, and almost as much in the upper portion as in the lower.

It results from this, that the normal cornea is neither a sphere, an ellipsoid of revolution, nor an ellipsoid of three axes. Of these three surfaces, that from which it differs least is the ellipsoid of three axes, if it is supposed that this has been flattened at the nasal side.

Sulzer, in 1891, in an excellent article on his work in the ophthalmological laboratory of the Sorbonne (1) confirms the views of Leroy on the asymmetry of the cornea. This rapid and unequal diminution of the radius of curvature in the four directions—internal, external, superior, and inferior—from the summit of the

(1) SULZER: The form of the human cornea and its influence on vision. (*Arch. of Ophth.*, 1891 and 1892.)

cornea leads to important consequences from the standpoint of As. Sulzer thus formulates them :

1. The peripheral portions of the cornea without central As. show an inverse As.

2. The peripheral portions of the cornea in weak direct As. in the centre have no As. or an inverse As.

3. The peripheral portions of the cornea in inverse central As. are more As. in the same sense than the central portions.

4. The peripheral portions of the cornea in direct central As. of a moderate or high degree are more As. in the same sense than the central portions.

The As. of the peripheral portions thus differs from that of the central portions, and it is thus understood why artificial mydriasis, by allowing the peripheral portions to come into play, will modify the amount of As., and sometimes even change its form (inverse instead of direct As.).

Another consequence of this corneal asymmetry should be noticed : the impossibility of perfectly correcting the As. by cylindrical lenses.

Dioptric Power of the Cornea.—There is no correspondence between the dioptric power of the cornea and the general refraction of the eye. Indeed, the dioptric power of the cornea may be weak in M, strong in H, and it has been seen to present a difference of 8 D in eyes which have the same condition of refraction.

Even in E eyes the cornea does not have a uniform dioptric power. This varies from 39 to 45 D., with an average of 43.5 D. (Swan Burnet, 1888).

The two corneæ of a non-As. person have a noticeable equality of refraction, and this is generally true in spite of high degrees of anisometropia. In the same way in an As. person the maximum and minimum curvature of the principal meridians of the two corneæ are equal each to each, if the two eyes have the same degree of As. (Swan Burnet, Javal).

The radius of curvature of the cornea tends to increase from infancy to adult age, so that its dioptric power diminishes from 1.50 to 2 D. (Chibret.)

It is asked if the radius of curvature of the cornea depends on height or on sex. Researches made up to the present time have given no conclusive result (Tscherning and Bourgeois, Steiger).

Race seems to have no influence on the size of the radius of curvature of the cornea (Chibret.)

Relative Proportion of Direct and Inverse Corneal As.; Their Degree. Direction of the Principal Meridians.—Direct As. (the vertical meridian the more refractive) is the most frequent, and

inverse As. (the horizontal meridian the more refractive) is only rarely seen—that is, in $\frac{1}{4}$ to $\frac{1}{10}$ of the cases.

Direct As. frequently reaches 1 to 3 D. ; it may exceed 6 D. Inverse As. is relatively less, it rarely exceeds 3 D. ; it is most commonly included between 0.75 and 1.50.

Value of the Total Astigmatism Deduced from the Value of the Corneal Astigmatism.—It should always be remembered that a static crystalline As. of about 0.75 is frequent, which becomes dominant when the corneal As. is very slight, and which compensates it partially to about 2.25 or 3 D. (Schioetz, Bull, Chibret, Martin).

This explains why the total As. is less than the corneal when this is direct, while the contrary exists if the corneal As. is inverse.

Variability of Corneal Astigmatism.—It is generally stated that the corneal As. is invariable. Very exact observations on the same person at long intervals seem to demonstrate the contrary (Bull).

In some cases of hypertonia with glaucomatous symptoms inverse As. tends to replace direct As. ; the hypertonia tends to displace the more refractive meridian from the vertical to the horizontal (Martin, Pflueger, and Eissen).

Compensating Astigmatic Accommodation.—Javal thinks that in a certain number of eyes, but exclusively among persons who use their spherical accommodation, there is a compensating astigmatic accommodation for their corneal astigmatism.

Eccentric Corneal Astigmatism.—When ophthalmometry is practised one is not slow to find that there are eyes for which investigation of the principal meridians by conformation is impossible. When the lines of the two mires are brought into coincidence the mires are deformed in a peculiar manner, which arises from the deformation produced by the eccentricity of revolution of the eyes. When such a case is met with, it goes without saying that the measurement of the corneal astigmatism as it is commonly practised is without value. Up to the present time observers have not sufficiently accounted for the decentration. One should always examine, in positions of non-conformation, if the mires are of equal size (Javal).

Spherical Refraction in Corrected As.—In general, in persons who have well established binocular vision, the more refractive meridians of the two eyes have the same refraction—that is to say, if the As. is corrected by convex cylinders, the same spherical glass ought to correct both eyes (Javal).

Advisability of Correcting Low Degrees of As.—One should not hesitate to prescribe weak cylinders, since low degrees of astigmatism may cause migraine, asthenopia, blepharitis, conjunctivitis,

posterior staphylomas and facilitate the development of myopia (G. Martin).

Astigmatism and Strabismus.—In the majority of strabismic cases the most astigmatic eye is the deviating one, because the least astigmatic has been chosen for vision (Javal). And also: "It seems to me legitimate to conclude that As., as H, is a predisposing cause to convergent strabismus" (Chevallereau).

Astigmatism and Myopia.—Finally, uncorrected As. plays an important rôle in the development of myopia in school children (Javal, G. Martin).

Post-operative Astigmatism.—Following cataract extraction there is seen :

1. The eccentricity of the corneal ellipse increases in the meridian parallel to the section.
2. The eccentricity of the corneal ellipse diminishes in the meridian perpendicular to the section, so that this meridian has almost a circular curvature.

These modifications, very marked in the first days after the operation, diminish afterward, and are partially preserved in the vertical meridian (Scimemi, 1889).

It is nearly thirty years (1866) since Javal estimated the definite post-operative As. from cataract operations as averaging $\frac{1}{4}$ —that is, 1.50 to 1.75 in dioptries. This value is still true.

Post-operative astigmatism is always irregular, although it may be in large part corrected. When it is due to a simple iridectomy, or to a cataract extraction with iridectomy, a discrepancy is frequently found between the ophthalmometric measurement and the subjective determination. This depends upon the fact that the iridectomy brings into use the peripheral portions of the cornea whose optical action is different from that of the centre.

On the Operation for Secondary Cataract.

DR. WICHERKIEWICZ (Posen).—There are two varieties of secondary cataract : first, the membranous secondary cataract complicated with synechias of the iris ; second, simple secondary cataract, formed by a simple thickening of the lens capsule without adhesions with the iris. In the first case, when the pupil is not completely obstructed, an endeavor should be made first to extract the membrane entire with forceps by a small peripheral incision in the cornea. If this is not easily done too great dragging should be avoided, and recourse should be had, as in cases where the pupil is completely obstructed, to iridectomy. A median triangular incision of the iris should be made with de Wecker's scissors. In the second case—that

is to say, in simple secondary cataract—discission is sufficient; but to avoid chances of infection, a puncture made with Knapp's knife in the periphery of the cornea in the scleral limbus, 1 millimetre in front of the iris, should be preferred to puncture of the transparent cornea. I propose to give this operation the name of anterior scleronyxis.

Dr. Abadie (Paris).—We are to-day perfectly equipped for the treatment of secondary cataract. When there is only a capsular débris it is easily extracted with a more or less modified form of Liebreich's forceps. When the iris drawn into the wound has taken the place of the former pupil, it is sufficient to section it with de Wecker's scissors.

Finally, in the more favorable cases, when the iris is covered with false membranes, I recommended several years ago a method which consists in making two simultaneous sections with two lanced knives: the scissors are introduced through the first incision, and with two cuts of the scissors a large flap is cut out, which is seized with forceps introduced through the second opening, and then drawn outside and excised. In this way dragging on the iris is avoided, which is always to be feared.

Dr. de Wecker (Paris).—I do not wish to undertake a discussion on the operation for cataract, which will lead us too far. However, I would like to state that every one now concedes that the accidents which may follow extraction may be traced to infection; so our attention should be given to the character of the wound, in order to avoid any immigration of germs. The same principles should be applied to the various methods of operation for secondary cataract, and the results will be the more certain, as the wound is more circumscribed, and as perfectly disinfected instruments are used.

Dr. Galezowski (Paris).—I think that haste should especially be avoided in operation for secondary cataract. The choice of situation for intervention also has its importance, and I prefer the central portions of the cornea.

Dr. Wicherkiewicz.—I will reply to Dr. Abadie that corneal wounds, even the smallest ones, should be avoided as far as possible, because they are more susceptible of infection than sclero-corneal wounds. I have had infections occur two or three days after an operation for discission, and it was clear that the infection originated in the small puncture of the transparent cornea, and that it progressed from the cornea toward the interior of the eye.

Endothelial Sarcoma of the Choroid.

DR. PARISOTTI (Rome).—(To be published in full).

Electrolysis in the Treatment of Detachment of the Retina.

DR. TERSON (Toulouse).—(To be published in full.)

Detachment of the Retina and Its Treatment.

DR. GALEZOWSKI.—The disease commences generally at the ora serrata.

Tearing of the retina is frequent in this region, but is not constant, and it is not the cause of detachment, as Lever thinks.

Nor is liquefaction of the vitreous the most frequent cause of detachment. It is a lymphatic infiltration which occurs between the choroid and the retina, at first transparent, and then becoming lemon yellow.

Synovial epithelium secretes synovial fluid, and may become the seat of a morbid exudative secretion. The same occurs in detachments (Boucheron) from the choroidal epithelium, which secretes a pathological fluid in abundance, causing an interstitial infiltration, and consequently detachment. The cause of this secretion is local. The general causes are rheumatism, gout, arthritis, syphilis, rarely, and injuries.

In 1880 I sutured in detached retina with catgut and obtained a few favorable results, but also some failures, which led me to abandon this method for another, which consists in performing repeated and multiple ophthalmotomies with suture, with an ophthalmotome in the form of a curved needle, which I have had constructed for this purpose.

Double Retinal Detachment in a Child Four Years of Age.

DR. TEILLAIS (Nantes).—Detachment of the retina, while very common in all ages, is certainly of very rare exception in childhood, but it deserves still greater attention when it attacks both eyes and is produced under circumstances so unforeseen that the etiological question seems to be a veritable problem for solution.

In the case which I wish to describe to you, the first signs of a change in vision were an uncertainty in the gait of the child, and then undecided movements of the head, which tended to incline to one side. Both eyes were well formed, and showed no fault in development of structure. As the child had had good vision, the idea of a congenital lesion is immediately rejected, and that of progressive diminution in vision is certainly linked with a relatively recent affection of the fundus of the eye.

Ophthalmoscopic examination gave the following results : In the right eye, slight opacities of the vitreous and detachment of the retina above to a limited extent.

In the left eye, detachment of the retina, including the entire

upper segment, abundant flocculi in the vitreous, and filaments resembling the débris of extravasated blood; in the retina, white patches of regression of blood foci.

As the diagnosis is indisputable, the interest centres in the etiology.

The only disease that the child had had was a severe attack of whooping-cough complicated with convulsions and hemorrhagic phenomena, sub-conjunctival effusions, epistaxis, sub-cutaneous ecchymosis, and flux of blood from the ear.

After reviewing the different causes likely to cause detachment of the retina, which could not be rejected *à priori*, and which were only excluded by analysis, the only acceptable one which remained as an etiological factor was that of hemorrhage of the retina and of the vitreous, which occurred in the course of the whooping-cough.

If to this is added the influence of repeated coughing, and the convulsions provoked by the violence of the incessant attacks, we have the two principal factors of double detachment of the retina in a child four years of age, which is a pathological fact without example up to the present time.

Dr. Sulzer (Geneva).—Some weeks ago, I observed a case of double progressive detachment of the retina in a patient twelve years of age. Besides being bilateral, this disease presented peculiarities which sharply distinguished it from the various kinds of retinal detachment ordinarily observed. It began in the left eye about two months before, and a short time after attacked the other eye. The progress of the disease was slowly progressive in both eyes. Vision is now reduced to counting fingers at a distance of from 1 to 2 metres. With the ophthalmoscope, an undulated swelling of the peripheral portions of the retina is seen. This swelling exists in all directions, and is hardly more pronounced below than above. The papilla and surrounding portions of the retina are sarcomatous. There is a diffuse disturbance of the deep portions of the vitreous. No history of the patient explains the etiology of the ocular diseases, and the treatment employed has been ineffectual.

Dr. Dor (Lyons).—For the past year I have obtained very good results in the treatment of detachment by combining Heurteloup's blood-letting with the application of three or four galvano-cautery points over the detached retina. The cauterization must be repeated twice, and later, once a week.

Dr. Dianoux (Nantes).—I have had good results from the sub-conjunctival injection of 1 c. c. of a saturated solution of chloride of sodium over the detachment.

Dr. Abadie.—I have only made slight modifications in the first technique which I described, and the results which I have obtained are almost the same as Dr. Terson's—from time to time a marked success, most frequently considerable improvement, and—an important fact—never a serious accident.

In old detachments, practically no result is obtained, and I have renounced it in such cases.

On the other hand, in juvenile non-myopic detachments success is constant—five in five cases.

I have endeavored to make several punctures with simultaneous electrolysis, but have not found it of any advantage. I prefer to make a second puncture several days after the first when this has produced no result.

Dr. Parinaud (Paris).—In the treatment of detachment of the retina by electrolysis a puncture of the sclera is made with a knife or a needle. But the results obtained can be explained by this puncture alone. Partisans of this method tell us that detachment of the retina, especially if it is recent, is frequently improved and sometimes cured. This is the same result which I obtained by a posterior sclerotomy, which, in my opinion, is the best and least dangerous treatment of detachment of the retina.

Dr. Boucheron (Paris).—There are still several points which should be mentioned.

The great majority of detachments of the retina cured by any method whatever are recent cases—that is, eight days or under. After that length of time the results become more and more doubtful and rare.

When the macula lutea is detached restoration of central vision is impossible; there is probably no case on record of restoration of central vision after detachment of the macula. The re-attachment of the retina, if it can be brought about, should, then, be effected before macula detachment to realize the greatest cure. The therapeutic period of the greatest advantage is when the detachment is still situated above.

If, then, it is essential to act early and quickly, what therapeutic tactics should be followed? It would seem, from what has preceded, and from my own experience, that operative intervention should be employed without delay. The operation chosen should have for its aim to reduce the ocular tension on the exterior surface of the retina, so that the tension on its interior surface shall increase either directly or indirectly (injections into the vitreous). Therefore, any puncture of the eyeball in the cornea or in the sclera will accomplish this fundamental fact.

When the retinal detachment is recent, with intact macular vision, the least dangerous operations would naturally be chosen, which are performed in the anterior segment of the eye (iridectomy, sclerotomy, repeated paracentesis, etc.), in order to preserve the sensory regions of the eye.

As for the older cases, the extensive detachments, whether sclero-choroidal or retino-sclero-choroidal punctures are used with or without electrolysis, they should always be combined with appropriate internal medication.

But since at the beginning of the treatment the principal indication is to gain time, it is by surgical interference that the cure of recent detachments should be commenced.

Dr. de Wecker.—The only difference between electrolysis and punctures is that in the former the opening is maintained, and forms a good drainage.

Dr. Wicherkiewicz.—I think that in detachment of the retina all operative interference should be avoided. Recovery may occur spontaneously.

Dr. Motaïs (Angiers).—In eleven cases of recent detachment of the retina which I treated with galvano-cautery points I have obtained three improvements and two recoveries. These are quite as good results as those obtained by the more dangerous method. I think, then, that it is prudent to rely on a method at least as efficacious as the others, and which never has the slightest complication.

On the Best Method of Treatment of Prolapse.

DR. GRANDCLEMENT (Lyons).—The following are the conclusions of my article :

Every *prolapse of the iris* left to itself is a permanent source of danger to the eye and to vision ; it threatens it either with *staphyloma* or *infection*.

It should, then, be immediately combated with surgical interference, for its spontaneous reduction, or reduction with eserine or atropine, is a rare and exceptional occurrence.

The three operative methods commonly employed are :

Excision, which is dangerous and very inconvenient.

Cauterization, which is painful and frequently inefficient.

Incision, which, on the other hand, if properly performed, gives a sure and rapid result.

This incision should consist in cutting the prolapsed tumor from side to side in the direction of its greatest diameter.

Dr. Chibret.—The method of Grandclément is very good, but I think it is still better to avoid prolapse, and for this purpose I have

described a method which consists in introducing the de Wecker scissors after extraction of the lens and seizing the iris if it presents itself between the branches of the scissors. Under these conditions, it is true, iridectomy will be performed in about 70 per cent. of the cases.

Dr. Dianoux.—I have attempted Chibret's method, but I have always been obliged to cut a fragment of the iris.

Iritis of Nasal Origin.

DR. FAGE (Amiens).—Since Ziem pointed out the relations which exist between nasal disease and certain forms of iritis, I have not found in medical literature a case in which ozæna figured as cause of iritis.

I have had a patient, twenty-two years of age, with ozæna, who, outside of his nasal affection, had no other cause of infection. In the beginning of January, an iritis developed in the left eye, and later the right eye showed symptoms of irido-choroiditis. There was atrophic rhinitis in the nose, and the nasal mucous membrane contained the cocci-bacillus of Loevenberg almost pure. I found the same microbe in the conjunctival cul-de-sac, but a search for it in the blood and the anterior chamber was ineffectual. Nevertheless, the eye of a rabbit, which was inoculated with a needle which had served for the paracentesis, became infected. The sinuses were transparent.

The latter part of April, the left eye had recovered, with persistence of some exudation in the anterior chamber. The right eye still remained inflamed with marked disturbance of the aqueous humor and changes in the vitreous.

These ocular lesions are to be attributed to infection produced by the microbe of ozæna, which is an agent capable of producing infection at a distance, provided the entrance of the blood vessels or lymphatics remain open. To say that a true infection should produce suppuration, is to deny weaker infections of which clinical experience gives us daily examples.

It is admissible, in cases where the nasal fossæ contain no pathogenic microbes, and where there is simply congestion of the iris, to attribute it to simple vascular disturbances; but the theory of infection should always be considered when, as in my patient, there is severe and tenacious iritis and a nasal disease the virulent microbial nature of which has been experimentally established.

Dr. E. Berger (Paris).—I have observed a case of iritis and otitis media of the right side, due to purulent rhinitis on the same side, caused by retention of the nasal secretion from an obstruction of the right nasal fossæ by a tumor of the nasal pharyngeal cavity. Partial extirpation of the tumor was followed by improvement of the iritis

and the otitis. Its new growth provoked an aggravation of the two diseases, which only recovered after total extirpation of the tumor.

The explanation of the danger of ozæna to the organ of vision by the results of bacteriological research is still somewhat uncertain. Terson and Gabrielides have found the cocco-bacillus of Loevenberg, in patients with ozæna, in the lachrymal fluid without alterations of the conjunctiva; on the other hand, in several ozæna patients observed by Dr. Berger, in whom there was a severe ocular disease, this bacillus was not found in the lachrymal fluid. These latter cases must be explained either by an increase of the virulence of the pyogenic microbes in these patients, or, rather, by the action of the toxines of the bacillus of ozæna. Dr. Berger explains by this action of toxines a case of central scotoma in a woman, thirty-two years of age, with ozæna, in whom the treatment of the latter was followed by an improvement of vision.

Dr. Mazet (Bordeaux).—The characteristics of Loevenberg's bacillus are not sufficiently differentiated from the bacillus of Friedlander. In cases of ozæna there are always other micro-organisms which may be the cause of ocular infection, and the case of Dr. Fage does not prove that this was actually an iritis of ozænous origin.

Dr. Fage.—I have simply attempted to establish this clinical type, as the disease had not yet been described.

The Common Etiology of Parenchymatous Keratitis and Choroiditis.

DR. CHIBRET (Clermont-Ferrand).—Parenchymatous keratitis does not form a special manifestation in hereditary syphilis. If it is most frequently observed in syphilitic children, it is because the child is more exposed than the adult syphilitic to all diseases of the cornea.

The period of puberty is especially favorable to the development of parenchymatous keratitis.

Exudative choroiditis is similar to parenchymatous keratitis, and deserves the same qualification to indicate an identical process and etiology. The two diseases are characterized by the presence of gommas more or less circumscribed, more or less diffuse or confluent.

Certain forms of descemetitis of dental origin simulate parenchymatous keratitis; they are differentiated by the fact that mercury aggravates them instead of improving them.

Exudative choroiditis is quite as effectually influenced by mercury as parenchymatous keratitis.

With the new methods of treatment by injection, and a more exact conception of the action of mercury and iodide of potassium, the progress of parenchymatous keratitis and choroiditis may be arrested,

the second eye preserved from attack, and recurrences opposed, which was formerly not admitted as possible.

Dr. Wicherkiewicz has seen cases of parenchymatous keratitis in scrofulous patients, especially after grip.

Dr. Galezowski.—Parenchymatous keratitis is always caused by hereditary syphilis.

Dr. Abadie.—Parenchymatous keratitis is most frequently due to syphilis. In the more severe forms of keratitis, good results are obtained from sub-cutaneous injections with the salts of mercury, but implication of the second eye cannot be avoided.

Dr. Chibret.—I do not attach any great importance to the memory of the patient in establishing the etiology of syphilis, and I believe fully in the importance of the specific action of mercury. As for the action of grip, I have noticed from my records, which I have preserved for many years, that a great many of my old syphilitic patients have had new diseases after grip. I am persuaded that true interstitial keratitis is always of syphilitic origin.

Dr. Antonelli (Naples) described a form of parenchymatous keratitis which is quite rare, and which has an origin and development common to that of uveitis and secondary acquired syphilis. The corneal infiltration is superficial, and produces no more peri-corneal injection than that of the concomitant iritis; the cornea shows no epithelial changes, is never vascularized, and may resume its transparency in a few weeks, while the iritis recovers under specific treatment. This form is, then, quite different from typical diffuse interstitial keratitis, and it is only described by Hock, under the name of punctate interstitial keratitis.

Seven Years of Ophthalmology in the Hospital Pen-Bron.

DR. DIANOUX.—(To be published in full.)

On the Use of Large Sub-conjunctival Injections.

DR. DE WECKER does not think that an antiseptic action can be obtained from the sub-conjunctival injection of a few drops of a $\frac{1}{1000}$ or $\frac{1}{1000}$ solution of sublimate, only a very small fraction of which enters the eye.

As he in no way favors the homœopathic system, he recommends, in ulcerating conditions of the cornea, the injection of a half or a full syringe full of a solution of sublimate $\frac{1}{2000}$ under the conjunctiva. (To be published in full.)

Dr. Vignes.—Sub-conjunctival injections of the salts of mercury have given me such unsatisfactory results in the treatment of choroiditis that I have sought other treatment. I have had recourse to the use of sub-cutaneous injections of iodine. I am at present

studying their action, and the number of patients that I have examined does not seem to be sufficient to definitely state the result. If I speak of it to-day, it is simply to put myself on record.

One of my patients, whom several of my colleagues present wished to examine, was emmetropic, had a double disseminated choroido-retinitis with macular lesions, and came to my clinic with a vision of $\frac{1}{10}$. After fifteen days' treatment, vision increased to $\frac{4}{10}$. Rest for a month: the condition remained stationary. Renewal of the treatment for fifteen days: vision increased to $\frac{8}{10}$. I have made other observations of equal significance.

Dr. Darier.—I am glad to notice the conversion of Dr. de Wecker to the method of sub-conjunctival injections of sublimate. As to the question of dosage, I do not think there is any advantage to be gained by injecting large quantities, as de Wecker recommends.

In 1888, I performed injections of large quantity, and I therefore do not see how Dr. de Wecker can claim priority for this modification in the method of sub-conjunctival injection.

Dr. Abadie.—When Dr. Darier made his first experiment with sub-conjunctival injections of sublimate at my clinic I did not always agree with him as to the therapeutic results which he thought could be obtained. I am scarcely a partisan of this method in diseases of the fundus of the eye, but I claim its undoubted superiority in the treatment of infectious ulcers of the cornea.

I am glad to see that there seems to be unanimity of opinion to-day on this point. There is no need of large doses in infectious ulcers, and I have treated very serious ones: in ozæna, injections of 3 to 4 drops of a $\frac{1}{1000}$ solution have given results complete and superior to all other forms of treatment, since the corneal tissue was completely respected.

Dr. de Wecker.—I would reply to Dr. Darier that I did not claim any priority for the method of large injections, but I also refuse him this priority, which he seems to claim, for it is not sufficient to say "I have done such and such a thing at such a time" to claim precedence; it should be based on a publication. This priority is without doubt due to our Italian colleagues.

Dr. Darier is mistaken if he thinks that I have been inconsistent in praising large injections to-day, and that I now recognize the utility of sub-conjunctival injections in general. Far from that, I retain my opinion; and I agree perfectly with my colleagues from Naples, as I stated in my article, that injections are excellent in infectious diseases of the cornea, but are otherwise ineffectual.

To my friend Abadie, I would say that if large injections are used, it is because injections of 1 or 2 drops have given far less satisfactory

results, and I would heartily recommend large injections of sublimate in every infection of the eye.

Congenital Malignant Tumor of the Orbit.

DR. LAGRANGE (Bordeaux).—Congenital malignant tumors are very rare. Here is a case seen at the Children's Hospital at Bordeaux. It is not only remarkable for its extreme rarity, but more so from the peculiar histological structure of the tumor.

This developed during intra-uterine life. At birth, it had reached the size of a moderate-sized pear, entirely filling the distended orbit, and having no relation with the eye and optic nerve, except propinquity, and connecting with the brain by the sphenoidal fissure.

Microscopic examination showed that it was a tumor of multiple tissues formed of two varieties of embryonic elements, one belonging to the connective tissue type, and the other to the nervous type. The latter elements were similar to those which are found at the beginning of the development of the spinal cord and brain; they were abundant in the tumor, which therefore deserved the name of glioma, although it in no way resembled gliomas of the retina, which are, in reality, only pure sarcomas with great differences in their structure, and having no truly characteristic structure.

Orbital Tumor Produced by Dilatation of the Ethmoidal Sinuses.

DR. ROHMER (Nancy), reports the case of a patient twenty-one years old, who four years ago was attacked with dilatation of the ethmoidal sinus. The author makes the following conclusions:

1st. Distention of the ethmoidal sinus will be shown before it is opened by a projection of the internal wall of the orbit, which may be more or less sensitive, or even painful, and which may reach the size of a small nut, or larger, and extends along the internal wall of the orbit to the fundus of the cavity; vigorous pressure with the finger will reveal parchment crepitation, which, combined with the following signs, will eliminate the idea of a true orbital tumor.

2d. There will be œdema, especially in the lower lid and in the malar and temporal regions, caused by compression of the ophthalmic vein, which, after following the internal wall of the orbit, traverses the sphenoidal fissure to empty into the cavernous sinus.

3d. Lesions from inflammation in the vicinity or from pressure on the optic nerve will be slow to appear in disease of the ethmoid or frontal sinuses, while they will appear relatively quicker when there is distention of the sphenoidal sinus (Panas). The projection of the ethmoidal wall of the orbit will have the effect of pushing the eye *en masse* toward the lower external angle of the orbital cavity, whi^l

the optic nerve will long be spared, and vision will remain good for a relatively long period. I should also add that meningitis complications, as well as inflammations of the cavernous sinus and of the ophthalmic vein, will also be more frequent in cases of lesions of the cavities of the sphenoid.

4th. The large opening of the orbit, aided if necessary by nasal catheterization, will decide the question and allow of precise localization of the lesion.

Some Remarks on Orbital Thrombo-Phlebitis.

Dr. MITVALSKY (Prague).—In cases of direct or centripetal orbital thrombo-phlebitis vision is preserved while the patient survives, while in the case of recurrent thrombo-phlebitis vision is abolished from the appearance of the chemosis and the exophthalmus. In the first case, the central vein of the retina and some of the small retinal veins are preserved and circulation is there free. In the second case there are thromboses in all the veins and inflammatory endo-vascular lesions. The retinal circulation is therefore prevented from the commencement of the disease.

Contribution to the Diagnosis of Vascular Tumors of the Orbit.

Dr. JOCQS (Paris).—I desire in this article to consider a rare symptom which may aid in the diagnosis of vascular tumors of the orbit. This symptom consists in the arrest of the souffle by pressure of the tributaries of the ophthalmic vein. I have only found one case, that of Dr. de Wecker, in which this symptom was described. I have myself once observed it in a patient who had both souffle and exophthalmus, and in whom the diagnosis of retro-bulbar vascular tumor was not doubtful. This souffle seemed to be due to pressure of the ophthalmic artery by the dilated ophthalmic vein.

The pathogenesis of venous dilatation may be explained in traumatic cases by a fracture of the sphenoidal fissure; in spontaneous cases, by endo-phlebitis.

This symptom eliminates the idea of arterio-venous aneurism, which sometimes necessitates ligature of the carotid. In case of venous dilatation, on the contrary, there can be no question of surgical interference. Medical treatment alone should be employed with pressure on the eyeball. Recovery seems to be possible.

Orbital Fibro-Sarcoma.

Dr. KALT (Paris).—I lately operated on a girl sixteen years of age, who for two years and a half had had an orbital tumor of very peculiar development. At first there was a reddish-yellow plaque on the upper external portion of the bulbar conjunctiva, which

extended to the upper fornix. Little by little, this infiltration gained the orbit, apparently disappearing at the point of origin. In two years a tumor was felt behind the eyeball, which seemed to adhere to the external orbital wall and surrounded the external rectus.

Exenteration of the orbital contents showed that the external rectus muscle was surrounded with a thick envelope of hard fibrous tissue, which stretched to its posterior extremity and laterally reached to the superior rectus and the lachrymal gland.

Histologically, it was found that the principal mass was composed of round and fusiform cells, and of vessels with adult or embryonic walls. The expansion of the tumor in the muscles and the lachrymal gland was uniformly embryonic.

This examination showed that it was a sarcoma which had originated in the bulbar portion of Tenon's capsule, and had then gained the orbital cavity. As many sarcomas seemed to have an external infectious origin, it is interesting to note that in this case the point of origin was the sub-conjunctival tissue, so exposed to infections of all kinds.

Ophthalmoscopic Examination with the Inverted Image of Highly Myopic Eyes.

DR. L. DEMICHERI.—(To be published in full.)

Anatomical Landmarks in Surgical Operations in the Orbital Region; Description of an Instrument.

DR. MOTAIS.—For the surgical topography in the orbital region, I propose two landmarks which have been of great service to me in my anatomical dissections: outward, the external orbital border at the commissure; inward, the point of insertion of the tendon of the orbicularis.

The instrument (orbitometre) which I have had made to utilize these two landmarks is composed of two branches of a compass with blunt extremities, a horizontal bar graduated in millimetres on which glides a graduated vertical bar, which carries a stylus with a tampon of aniline.

Its use is most simple. A table shows the distance in relation to the landmarks of all the principal points, to be determined with variations according to the differences in size of the orbital opening. For example, for the orbital insertion of the inferior oblique muscle I fix the vertical bar at 26 millimetres on the horizontal bar. The stylus, descending on the vertical bar until it meets the lower orbital border, inscribes without possible error the point sought for.

The determination of the points of immergence of the frontal

nerves, internally and externally, of the nasal nerve, of the infra-orbital nerve, of the supra-orbital nerve, etc., are also simple. The lines of direction of certain organs in the orbital cavity (the frontal nerve, oblique and recti muscles, ailerons, etc.) may also be determined with the orbitometre. Finally, symmetrical points of the posterior hemisphere of the eyeball may be inscribed on the anterior hemisphere, the bulbar insertion of the oblique muscles, etc., thus rendering possible very rational operations, which have as yet been considered impracticable.

Dr. Sulzer remarked that *Dr. Motais's* instrument might be utilized in measuring exophthalmus.

Cleaning out Cortical Masses in Cataract Operation by Injection and Aspiration.

DR. DRANSART (Somain) advises aspiration of the lens detritus by means of *Chibret's* instrument (a syringe with a double current). It is the best method of obtaining good vision after cataract operation, and also the surest guarantee against prolapse of the iris. He reviewed recent articles on this question: the thesis of *Betremieux*, the practice of *Coppez* and *Redard*.

Dr. Wicherkiewicz stated that in 1886 he had proposed a special instrument for extracting lens masses.

Dr. Vacher (Orléans), who is in favor of these post-operative injections, performs them with a rubber bulb.

Dr. Panas (Paris) has abandoned the rubber bulb to return to the syringe, which is less likely to allow air bubbles to enter; he proposes, however, with these injections rather to sterilize the anterior chamber than to evacuate the cortical masses.

Dr. Parinaud has a rubber bulb and a glass pipette, so that the entire instrument may be sterilized by boiling.

Dr. Galezowski prefers removing the masses with a curette.

Dr. Darier (Paris) fears that syringes of double action (*Chibret's* instrument) expose the iris to injury.

Dr. Parisotti (Rome).—I think that the cleaning out of the anterior chamber is only serviceable in cases where simple massage would be sufficient. It is to be hoped that those who advise drainage of the anterior chamber can assure us that they have always obtained the maximum vision in cases where there are sticky cortical masses difficult of detachment.

General and Refractive Modifications of the Eyeball Following Extraction of the Lens.

DR. TRUC (Montpellier).—Clinically, loss of the emmetropic lens is corrected by a spectacle glass of 10 or 11 dioptries, and may be

estimated at 10 dioptries. There are, however, marked differences in myopia, and may be in hypermetropia. At any rate, in the refraction of the aphakic eye the total and refractive modifications possible in the eyeball have never been taken into consideration. They are, however, interesting. As we can only exceptionally measure, weigh, and gauge the human aphakic eye in comparison to its normal mate, I have experimented on animals, especially rabbits. Extraction was performed on one eye by various methods, and the other remained intact, and then both were exactly compared.

In fifteen successful operations, I found the aphakic eye, on an average, lighter by 0.20 gr., smaller by 0.130 c. c., and reduced by 0.6 millim. in the antero-posterior diameter; these figures have the greater value, as precise calculation showed that in the normal condition the right eye is somewhat larger, heavier, and more voluminous than the left eye.

In the new-born or very young subjects the development of the eye may be diminished as that of the orbit after enucleation, but my little animals did not survive, so I could not verify this. There is always retraction of the eyeball, and the removed lens will not be completely replaced by the aqueous or the vitreous, as is supposed; besides, there will be axillary H. of about 2 D. Removal of the lens seems, in fact, to modify the entire eyeball, and the diminution of the refraction seems to be due, not only to loss of the lens, but also to retraction of the eyeball. This retraction may be greater in M. with a large staphyloma, and less in H. These ideas are, I think, new, but are as yet provisional, as the experiments are complex and still few in number.

Dr. Chibret.—Ophthalmometric measurements led me several years ago to the conclusion that extraction of the lens produced not only deformation of the cornea, but also a shortening of the antero-posterior axis of the eye.

Dr. de Wecker.—The rigid sclera of old people, in my opinion, does not permit of a change of form of the eye after lens extraction.

Dr. Parinaud.—I have had occasion to observe a case in which excessive myopia developed after extraction of both lenses at the age of six years. There was also detachment of the retina.

Dr. Motais.—The retractor muscle, which exists in the rabbit but not in man, may produce a flattening of the eyeball after extraction of the lens of a rabbit. This muscle may thus be a source of error.

Dr. Truc.—I find, as I thought, that the subject of my article is quite new, and as it is interesting, I shall be glad to continue my experiments.

The possible retraction of the eyeball after removal of the lens has been exceptionally and hypothetically supposed, but it has never been investigated; I have found it in two cases, the first of which gave me the first idea of undertaking these experiments.

Dr. de Wecker seems to think that retraction of the aphakic eye in an old person is hardly possible; if it seems more rational in a child with a supple eye, it is also so, though in a less degree, in the adult or old person. I do not think that the retractor muscle of the eye has any marked effect in producing flattening of the eyeball; it is, however, a point to be considered.

A New Application of Torric Lenses for the Correction of Certain Forms of Irregular Astigmatism.

DR. JAVAL (Paris).—Torric lenses are ordinarily cut on the equatorial border of the torus. They may be cut on the horizontal face of the coronna which forms the torus, and then lenses are produced whose focal image is projected according to a regular curve.

These glasses are suitable for correcting that particular kind of ametropia the knowledge of which is still quite recent—that is, decen-tration of the eye.

Dr. de Wecker.—Is the visual defect of which Dr. Javal speaks the result of malformation or of a pathological condition? Is there a special physiological form?

Severe Ocular Manifestations of Syphilis and Their Treatment.

DR. ABADIE.—I call severe ocular manifestations of syphilis those which involve the choroid, retina, or optic nerve, are of rapid development, and which, if left to themselves, or are improperly cared for, lead, in a short time, to irreparable loss of vision.

Commonly, these ocular complications are late to appear. They show themselves ten, fifteen, or twenty years after the initial lesion in patients who have had to that time insignificant or no complications and who have not undergone prolonged mercurial treatment. Exceptionally, in the form of secondary complications, the deep membranes of the eye and the optic nerve may become involved. The prognosis of these lesions is, then, quite serious if they are given time to disorganize the sensory elements of the retina, and their treatment should be energetic.

Mercury administered by the digestive tract, pills of proto-iodide, Guibert's iodide, and iodide of potassium are altogether insufficient. Recourse must be had to sub-cutaneous injections of cyanide or bi-

chloride of mercury, and, in the more severe cases, to intra-venous injections of the same solutions.

For more than a year I have daily performed ten or twelve intra-venous injections, and have never had a single accident. I have had accidents with sub-cutaneous injections, which sometimes produce an abscess, but I have never seen this with intra-venous injections.

But to obtain such results a special apparatus is necessary, and, still more, rigorous antisepsis: I wash the region where I intend to make the injection very lightly with a $\frac{1}{1000}$ sublimate solution, and apply a ligature to the upper portion of the arm.

I use a syringe made entirely of glass; the piston is also of glass. It is a very simple instrument, with which no accidents ever occur. With a flax piston, in which the substance may unravel or tear off, accidents may happen, while with a glass instrument there is not the least fear of danger.

Dr. Abadie presented several cases in which vision which had become defective in spite of the employment of classical treatment was only maintained by means of sub-cutaneous or intra-venous injections of salts of mercury.

Dr. Galezowski.—Baccelli was the first to successfully perform intra-venous injections of sublimate, but Karmanski claims to have had serious accidents as the result of this treatment. In choroiditis I have found nothing as good as mercurial inunctions, only they must be continued for a long period, and especially without interruption. Two years' treatment is necessary.

Dr. Chibret.—At the present time the superiority of injections seems to be incontestably established; the prolongation of their use is more susceptible of discussion. Mercury finally becomes a poison which must be eliminated. Albuminuric persons must be particularly watched in this respect.

Dr. Parisotti confirms the results obtained by Dr. Abadie after what he had seen at Baccelli's clinic. There is no danger in making these injections, and the results are very encouraging.

Dr. A. Darier recommends injections which are really mercurial transfusions. He injects 5 c. c. of a $\frac{1}{1000}$ solution of cyanide of mercury in artificial serum.

Dr. Abadie.—I know very well, as every one does, that Baccelli was the first to perform intra-venous injections of sublimate, so I have no intention of claiming precedence for this. I desire simply to describe the very encouraging results of this method, and to state that there are severe forms of ocular syphilis which have resisted all

other forms of medication but have been improved by intra-venous injections.

Posterior Sclerotomy and Sclerectomy in Glaucoma.

Dr. PARINAUD.—(Published in full in this number, p. 305.)

Dr. Masselon.—I do not believe that the kind of angular scleral puncture which Dr. Parinaud describes can be recommended for constant use; it exposes the eye to internal hemorrhages which are not always easily reabsorbed, and may lead to permanent alterations. Nevertheless, the scleral wound, as Dr. Parinaud says, should not be too narrow, and if a very tapering cataract knife is used (de Wecker's knife), the section must be slightly enlarged. The ancients, who commonly performed this kind of an operation to combat glaucoma, which they called hydropsy of the vitreous humor, employed a cataract needle—that is, a narrow lanceolate knife.

Dr. Terson.—I only perform posterior sclerotomy in eyes where the vision is lost. I think that the vitreous should only be disturbed when there is nothing else to do. When puncture is practised it should be repeated several times, and always in the same place. In a patient with hemorrhagic glaucoma, I repeated the puncture six times and obtained a cystoid cicatrix.

Dr. Jocqs considers posterior sclerotomy as perfectly justifiable in cases of acute glaucoma where iridectomy is not feasible for one reason or another—for example, where chloroform cannot be given.

Dr. Galezowski recommends anterior sclerotomy, so as to act upon the canal of Schlemm.

Dr. Motais said that he had never seen the hemorrhagic accidents in the vitreous mentioned by Dr. Masselon, because he made his puncture quite near the cornea and far from the more vascular region of the choroid.

Dr. Parinaud.—It is quite possible that a hemorrhage of the vitreous may occur after posterior sclerotomy, but this hemorrhage is quite rare and is never serious; it is far less serious than prolapse of the iris, which sometimes complicates anterior sclerotomy, even in the hands of the best operators.

Glaucoma and Myopia.

Dr. PUECH (Bordeaux) described the case of a patient who had a first attack of glaucoma at the age of twenty, at which time the vision was excellent, the patient being emmetropic.

The attacks were renewed at various intervals, though not with the primary severity. After each attack the eye, under the influence of the increase of intra-ocular pressure, elongated at the expense of the ciliary region, the sclera of which finally was thinned out and assumed the color of a ciliary staphyloma.

The first effect of the elongation of the antero-posterior axis was the development of myopia, which, at first slight (3 dioptries), has now reached 10 dioptries. Glaucoma in this particular case produced a myopic eye.

Dr. Dransart (Somain).—Cusco and Laqueur have observed transformations of glaucoma into myopia. I personally have seen this transformation occur in a man eighty-five years old. These cases authorize us to combat the myopia with sclerotomy.

Dr. Despagne (Paris).—In progressive myopia peri-orbital pains are observed, due to an exaggeration of tension. These pains yield to iridectomy, but not to sclerotomy.

Dr. de Spéville (Paris).—In a case of sub-acute glaucoma I performed iridectomy on one eye and sclerotomy on the other in the same sitting. The sclerotomized eye is now the better of the two.

Results of the Operation for Entropion and Ptoxis by the Methods of Gillet de Grandmont.

DR. BOURGEOIS (Rheims).—I have constantly used these methods and have had nothing but successes. In some cases, for entropion, the operation may be completed by external canthoplasty. In ptoxis, if it is very marked and a first intervention has not produced a complete correction, it may be cured by one or two sutures according to the method of Dransart. In fact, these methods are simple in their execution, always effective, and remarkable for their permanency. They deserve a high rank among classical methods.

A Rare Complication After Cataract Extraction.

DR. DE SPÉVILLE (Paris).—(To be published in full.)

Mercurial Exanthemata (Cutaneous and Ocular Hemorrhages).

DR. GUIBERT (Roche-sur-Yon) reported two cases in which comparatively small doses of mercury produced cutaneous hemorrhages comparable in every way to those of *purpura hemorrhagica*. These

hemorrhages in both cases were accompanied with ocular hemorrhages. Mercury had been injected in the form of the oil of the bi-iodide (Prof. Panas' formula).

The author attributes these hemorrhages, not to the method employed (he knows of no method better or more prompt), but to an idiosyncrasy on the part of the patients which should put us on our guard against the abuse of mercurial treatment.

Blepharoplasty.

DR. LANDOLT (Paris) presented two cases of blepharoplasty: the first, a tearing of the lower lid from the kick of a horse; the second, an epithelioma of the lower lid. Total ablation of two-thirds of this lid. Blepharoplasty by sliding a vertical flap taken from the cheek and blepharoraphy.

The speaker described a third case in which there was cicatricial destruction of the middle portion of the lower lid and distichiasis.

Diseases of the Eye in Vendée.

DR. CHEVALLEREAU (Paris) gave a résumé of the observations which he had made during the last five years in Vendée on patients of Celtic origin, and pointed out the relative frequency of ocular affections in that region

Diseases of the lachrymal ducts, the lids, the muscles, the cornea, and the choroid are rare; anomalies of refraction are frequent; finally, diseases of the lens, of the vitreous, and glaucoma are very common.

A curious peculiarity in this essentially agricultural country, where great industries are rare, is the great frequency of affections of traumatic origin. Thus, against 63 cases of complete senile cataract of spontaneous origin, I have observed the enormous proportion of 25 traumatic cataracts, among which 23 were caused by pricks from the spines of hedges. In fact, all the fields are separated from each other by thick hedges composed in great part of hawthorn, which form impenetrable barriers to the cattle. Twenty-three of these 25 patients, paysans or hunters, tried, in order to avoid a long détour, to cross through one of these hedges, and thus acquired traumatic cataract.

Another interesting fact is the relative frequency of injuries from the horns of cattle; I have seen five such cases in Vendée during the last five years, and only saw one in Paris in twenty years. In each of these 6 cases the eye was absolutely destroyed by the injury, but this refers only to the eyeball, as the lids were not affected in the least.

Congenital Ophthalmoplegia Externa.

DR. GUENDE (Marseilles).—I have seen three cases of congenital ophthalmoplegia externa. The first case was that of a girl twenty years of age with very pronounced double ptosis and almost absolute fixation of the eyeballs in the external angles of the lids; there was also myosis without apparent reaction to light; accommodation was normal. In spite of marked atrophy of the left internal rectus found in the course of an operation for musculo-capsular advancement with tenotomy of the antagonist, I concluded that there was a systematic lesion of the posterior nuclei of the third and fourth nerves without participation of the subjacent nuclei of the third ventricle.

In this case, as in the two others, where there was complete double ophthalmoplegia externa, heredity may be suspected. It was not possible to find whether the parents had had syphilis.

Dr. Sulzer called attention to the partial persistence of a convergent strabismus after complete ophthalmoplegia externa. This phenomenon shows the importance in strabismus of the retraction fibres so well described by *Dr. Parinaud* in his report on strabismus (*Soc. française, 1894*).

Panophthalmitis as the Result of Old Adherent Leucomas.

DR. A. TERSON (Paris).—It is known that panophthalmitis may develop spontaneously in eyes which have had corneal cicatrices for many years with more or less complete strangulation of the iris as the result of spontaneous or operative perforations. These late complications occur unexpectedly, without being preceded, in the great majority of cases, by any symptoms of general infection or conjunctival or lachrymo-nasal process.

I will briefly describe four cases of this kind. The first, very probably unique, was a patient with Algerian granulations and a double adherent leucoma of several years' duration. Without appreciable cause he developed a spontaneous sub-acute phlegmon in both eyes in one month, which necessitated enucleation. The three other patients also had phlegmon, as the result of adherent leucoma. Two were also treated with immediate enucleation; the third, whose eye had already perforated, preserved an excellent prosthetic stump after resection of the anterior segment of the eye.

From the pathogenetic standpoint, these were infections of the eye arising from conjunctival microbes which had followed the track of the strangulated iris and caused suppuration of the ciliary body

and of the vitreous humor, as was shown by anatomical preparations. There is, then, an ectogenous infection which precedes this complication, and it may be arrested at the onset by cauterizing the external infected point with the actual cautery. Sub-conjunctival injections of sublimate are also to be recommended. When phlegmon appears, if the eye is not perforated, immediate enucleation should be performed without consecutive sutures; if it is open, resection of the anterior segment is sufficient.

As preventive operations, recourse may be had to synechotomy combined with repeated iridectomies and also iridodialysis, but if the slightest adhesion of the iris persists the phlegmon may appear later.

Retinal Hemorrhages in a Case of Hereditary Hæmophilia.

DR. VIALET (Paris) described a case in which hæmophilia was the cause of hemorrhages into the retina and the vitreous. This man, who was the son and grandson of hæmophilic persons, was troubled during his entire youth with obstinate epistaxis, and at the age of twenty-nine had for the first time a profuse hemorrhage into the vitreous, which led to complete blindness in the right eye. The ophthalmoscope revealed the presence of a large new membrane in the fundus of this eye, fixed at both extremities to the retina, movable in its median portion, and which was displaced with the movements of the eye. The papilla was completely atrophied, and the central vessels were reduced to small filiform branches which stopped at a short distance from the optic nerve.

After an interval of eight years of perfect health this individual had multiple retinal, papillary, peri-papillary, and macular hemorrhages in the left eye. The latter were of peculiar appearance, being in the form of a series of small rounded or oval spots of equal dimension and connected with fine vascular ramifications.

Coincident with these lesions was a diminution of vision, which was reduced to $\frac{1}{10}$ of the normal, and a paracentral scotoma situated under the point of fixation.

Under the influence of proper treatment, absolute rest, milk diet, iodide of potassium, etc., the hemorrhages in the left eye disappeared without leaving a trace; the scotoma diminished to three-quarters its former size, and vision returned to $\frac{1}{10}$ the normal—an improvement almost equivalent to a cure.

A Pocket Campimetre.

DR. WICHERKIEWICZ exhibited an instrument which is a convenient modification of that of Schweigger.

The Subjective Method of Optometry.

DR. BULL (Paris) attributes the majority of errors committed in the determination of refraction by subjective methods to the fact that observers have not changed their method of examination since the discovery of astigmatism. Nearly all oculists are still under the influence of the old masters. All the books advise determining the degree of myopia by endeavoring to find the weakest concave spherical glass which gives the greatest increase of vision, and for hypermetropia to find the strongest convex spherical glass which allows the patient to see distinctly at a distance.

While this was admissible when astigmatism was unknown, these two rules are to-day the cause of many errors, because the spherical glass thus found is left in the trial frame before the patient's eye while an attempt is made to determine the astigmatism by questions relative to the dial, the star, or by trying various cylindrical glasses. Dr. Bull showed the error of such a method, for if there is astigmatism, the spherical glass found over-corrects the myopia or under-corrects the hypermetropia, and therefore the patient is disposed to accommodate for one or another set of rays of the dial, and his answers relative to questions about the dial are illusory. It is on account of these confused responses that many observers have given up the use of the dial. Dr. Bull, however, showed that they were wrong. He recommends the use of the dial in all cases. His method of examination may be thus briefly stated: He corrects or renders emmetropic the least refractive meridian of the eye with a spherical glass, and then the error which remains is always found under the form of a simple myopic astigmatism which he corrects with a concave cylindrical glass. In this way trials with so many concave and convex glasses are avoided, and the question of knowing whether there is mixed, myopic, or hypermetropic astigmatism never presents itself during the examination.

Deformation of Objects Seen Indirectly.

Dr. TSCHERNING (Paris) performed a series of von Helmholtz's experiments, showing that objects seen indirectly undergo a shortening toward the periphery. Straight lines seen indirectly seem concave toward the point of fixation.

By means of a small artificial eye reproducing as exactly as possible the dimensions of the human eye, Dr. Tscherning has been able to show that the retinal images show exactly the same deformations. They are due to the projection of the image on the surface of the

retina, the posterior portion of which approaches more or less to the form of a sphere. The similarity between these deformations and the observations of von Helmholtz is such that there seems to be no doubt that the illusion is due to the deformation of the retinal images, and not to an error of judgment, as has been commonly supposed.

Artificial Illumination of the Ophthalmometer.

DR. AUGIERAS (Laval) has succeeded in artificially illuminating the model without the disc of Dr. Javal's ophthalmometer. On the lower surface and in the middle of the arm which supports each mire is fixed a shank of copper furnished at its extremity with a portable electric lamp.

Ophthalmotonometric Study.

DR. OSTWALT (Paris).—The controll experiments to which I have submitted Maklakoff's tonometer on the one hand and Fick's instrument on the other (see *A. von Graefe's Arch.*, Vol. XL., 5; *Annales d'Oculistique*, 1895, p. 212) have convinced me that Fick's apparatus is by far the better for absolute measurements. This tonometer has offered, up to the present time, the inconvenience of requiring at least two observers. I have modified it in such a way that it can be employed without an assistant, my instrument being self-registering.

Optical Correction After Cataract Operation.

DR. ANTONELLI.—The average of three months for determining the definite astigmatism seems to me quite correct, and the degree of this normal post-operative astigmatism, so to speak, may be calculated as 2.5 or 3 D., after subtracting the corneal astigmatism which existed before the operation. This latter consideration explains why, in statistics, so many cases show an inverse post-operative astigmatism of about 2 D.

For the exact correction of astigmatism after cataract operation the ophthalmometric formula is almost indispensable. In the first place, for the direction to be given to the cylinder, which skiascopy cannot indicate with as much facility and precision; in the second place, for the strength of the cylinder. In this respect the relations between corneal As. and total As., for post-operative As., are a little different from the ordinary relations given in Javal's formula. The cylinder accepted by the patient is *always weaker*, in spite of the inverse nature of the As., than the degree indicated by the ophthalmometer. This difference may be 0.5 to 1 D. for the ordinary degrees of post-operative As.; it may be stronger (2 to 2.5 D.) for a post-operative As. of 6 to 8 D.

To avoid the inconvenience that the combination found by the oculist will not correspond with the glass cut and fitted by the optician, I have thought of a special box containing five series of lenses, from + 8 to + 18 D. The first series to be composed of simple spherical glasses, the others of the same numbers combined with cylinders of + 1 to + 4 D.

Massage of the Eye.

DR. PARENTEAU (Paris).—Massage of the eye and its adnexa is a therapeutic method which merits investigation, experimentation, and application to many diseases.

Performed in a careful manner, so as to cause no traumatism, massage may be useful in disturbances of the lids, such as cysts, chalazions, swellings, etc. In proper ocular affections I consider it too dangerous.

Medicated massage has the double advantage of causing ointments or powders introduced between the lids or applied to them to penetrate the eye more thoroughly and to cause a more rapid disappearance of congestion of the eye and its envelopes. It is especially indicated in phlyctenular kerato-conjunctivitis, corneal leucomas, iritis, episcleritis, and irido-choroiditis.

Simple massage, that is performed with the fingers or special instruments, without medication, is indicated whenever there is muscular alteration of peripheral origin or vascular disturbances.

Massage is, however, contra-indicated in the following cases: strong progressive myopia, considerable hypotonia, and commencing lens opacities.

Dr. Grandclément.—I employ ocular massage in interstitial keratitis. With this treatment I obtain recovery in fifty to a hundred days.

Dr. Sulzer.—East Indians make frequent use of massage, and obtain very good results from it. They use very light frictions, and frequently perform massage with the tongue across the lids.

Treatment of Conjunctivitis by Prolonged Sub-Palpebral Irrigations.

DR. VACHER (Orléans).—Sub-palpebral injections by means of a glass canula with an olive-shaped termination are very simple and at the disposal of all. They render important service in the treatment of conjunctivitis in disembarassing the cul-de-sac of purulent

secretions. They should not, however, constitute the exclusive treatment of conjunctivitis.

At the beginning of conjunctivitis warm irrigations are preferable. I employ them at 40 and 41°.

Cool and very cold irrigations act better in the period of decline.

To avoid corneal lesions, and to allow a large quantity of fluid to be passed, it is better to use weak solutions.

I have tried nitrate of silver $\frac{1}{1000}$, $\frac{1}{5000}$, permanganate $\frac{1}{1000}$, $\frac{1}{5000}$, sublimate $\frac{1}{5000}$, $\frac{1}{10000}$, cyanide of mercury, pheno-salyl, and carbonate of soda, followed by antiseptic irrigation. In acute iritis I use very weak solutions of atropine or decoction of belladonna leaves. The patients experience a real advantage.

Dr. Abadie.—When we are treating commencing ophthalmia, whatever it be, even purulent ophthalmia, it is possible that irrigations with any solution whatever will be efficacious: with permanganate of potash, weak solutions of nitrate of silver, naphthol, etc. I concede the claims of the partisans of these solutions and washes that may be employed at the beginning of ophthalmias, for at that time we do not know what will be its clinical progress, and have no means of knowing whether it will be serious or not.

In these cases bacteriological examination is only a feeble aid in deciding on the prognosis. In purulent ophthalmia it was supposed that the gonococcus was met with only in the purulent form, but it seems now that it also occurs in the benign form.

This method of diagnosis is therefore insufficient. I lately read an account of a discussion on this subject at the Medical Society of Lyons in which it was stated: "As soon as gonococci are found, employ cauterization; if they are not found, employ irrigation, and that will be sufficient."

But the question is not so simple. When an ophthalmia, either diphtheritic or purulent, is commencing, we are not informed by bacteriological examination as to its future clinical course, and are obliged to rely on the old classical symptoms, which alone will inform us of its gravity.

Therefore, in the beginning, when you have a purulent ophthalmia to treat, try irrigation; it is good, and I grant that this ophthalmia, which otherwise might become very serious, may be modified in a favorable way. But what I cannot grant is, that when the disease is well confirmed and established, when it has become serious, and when corneal applications threaten, these irrigations should be continued exclusively, without recourse to cauterizations with nitrate of silver; it is then that you will lose corneæ and eyes.

It is understood, then, that we are in accord as to the use of irrigation in the beginning, but only in the beginning, and that the partisans of these irrigations should not claim that these solutions cure when the disease is well established.

Drs. Chibret and Teillais consider nitrate of silver as a sure method of treatment in conjunctivitis, and that no other form of treatment should be substituted for it in severe cases.

Dr. Galezowski insists on the necessity of making two cauterizations of nitrate of silver daily in treating ophthalmia.

Anterior Synechias and Synechotomy.

DR. GAUPILLAT (Troyes) favors interference in all cases of synechia, even when they are uncomplicated, whenever the synechia is central enough for the performance of synechotomy.

He calls attention to the æsthetic side of the operation, for, unless informed of it, it would never be perceived that an anterior synechia had existed. The speaker regrets that synechotomy, as performed by Desmarres, has fallen into disuse.

Dr. Despagne says that this operation should be preserved, and that in reality it is as he has seen *Dr. Galezowski* perform it.

Methodic Curetting of the Cornea in the Treatment of Pterygium.

DR. DESCHAMPS (Grenoble).—In several cases of pterygium I have employed vigorous curetting of the denuded corneal surface after carefully detaching and excising the membrane. I have used a small curette, commonly employed for curetting corneal ulcers. This curetting removes all the enclosed débris from the surface of the cornea. It disinfects the wound in a perfect manner, and prevents recurrence. It should be substituted for the galvano-cautery, which is a blind method, and which produces a useless superficial scar.

I then perform simple conjunctival autoplasty only by sliding the flap, a few snips of the scissors freeing, if necessary, the portions which are too tense and drawn by the sutures.

A New Type of Paralysis Associated with Horizontal Movements of the Eye.

DR. SAUVINEAU (Paris).—Until lately we have classified all ocular paralyzes under the old headings of paralyzes of the third, fourth, and

sixth pairs of cranial nerves. At the present time a large number of cases difficult to understand are classified as ophthalmoplegias.

There exist, however, certain paralyses which are neither isolated palsies of one of the three cranial nerves which are distributed to the muscles of the eye, nor are they ophthalmoplegias: these are the palsies of association. These paralyses affect the muscles, which produce similar movements in both eyes. It is the movements of the eyes which it is important to consider, and not the paralysis of this or that isolated muscle. A muscle may, perhaps, be paralyzed for a certain movement and retain its action for all others.

Among the paralyses of movement (horizontal movements, vertical movements, movements of convergence and divergence) the movements from side to side are the most interesting to study, for the explanation of movements of association, the same movement in two muscles (external rectus on one side and internal rectus on the other), supplied by different nerves, has for a long time exercised physiologists. This is the variety of paralysis still not observed which is mentioned here.

Just here I would describe two types of paralysis of side to side movements. The first was noticed by Foville (1858), and more especially by Féréol and Groux. These authors have shown that a lesion of the *eminencia teres*—that is to say, of the nucleus of the sixth pair—causes a paralysis of the external rectus of the corresponding side, and of the internal rectus of the opposite side.

The interpretation of this fact has been given by Drs. Duval and Laborde, who have established that the nucleus of the sixth pair sends anastomosing fibres to the internal rectus of the opposite side, fibres which serve to associate the internal rectus with the external rectus of the opposite side in the same lateral movements, while for movements of convergence this same internal rectus receives special enervation from the nucleus of the third pair.

The second type has been described by Dr. Parinaud. It consists in a paralysis of the external rectus of one eye, while the internal rectus of the other eye not only is not paralyzed, but, on the contrary, is in a state of spasm more or less pronounced. The lesion is situated in this case beneath the nucleus of the sixth pair in the course of the nerve to the external rectus.

I have observed a third type, clearly marked, which is exactly the reverse of the preceding. It is the internal rectus of one eye which is paralyzed (for lateral movements only, the movement of convergence remaining intact), while the external rectus of the other eye is

the site of spasm. The lesion seems to be situated in the medulla in the course of the anastomosing fibres going from the nucleus of the sixth pair to the internal rectus of the opposite side.

The Pneumococcus in Ocular Pathology.

DR. CUÉNOD (Paris) said that he had found the pneumococcus as a cause in certain mild, and also in certain grave, ulcerations of the cornea. His researches upon the catarrhal inflammations of the lachrymal sac had demonstrated to him the frequent presence of these bacteria in these affections.

A case of panophthalmitis and adherent leucoma accompanied with inflammation of the lachrymal sac showed the presence of pneumococci in great abundance in the pus from the eye and the mucus from the lachrymal sac. In another case of panophthalmitis, in which a sympathetic irido-cyclitis had developed, the existence of the pneumococcus was also demonstrated by inoculation of mice.

The pneumococcus, found normally in the upper respiratory tracts, sets up disturbances of the eye from without in the conjunctiva and cornea, but also by infection from within in the orbit and the deeper tissues of the eye. In external infection the lachrymal ducts seem to be the way by which infection ascends from the more or less latent infection in the nose.

Superficial Cauterization of the Cornea with the Actual Cautey in Cases of Infiltration Following Purulent Ophthalmia.

DR. SUREAU (Paris) recommends, as a last resort, where, in spite of treatment for purulent ophthalmia in the new-born, the cornea is infiltrated, softened, and disintegrated, actual cauterization superficially applied over the whole corneal field. In two unfortunate cases, treated as hopeless, the result has surpassed all that could have been foreseen.

Permanganate of Potash in Ocular Practice.

DR. VIAN (Toulon) uses in the septic affections of the eye and its adnexa a concentrated solution of permanganate of potassium.

He cites two cases of purulent ophthalmia cured by daily application with a brush of a 10% solution of permanganate, and by bathing with the same in solution $\frac{1}{2000}$. The first was a man, seventy years old,

who presented the following symptoms : the lower lid had been eaten away by a cancerous ulcer ; the upper lid completely covered the eye, and it was impossible to invert it, so that in cauterizing the upper lid the cornea was touched and turned a decided brown color. For three days the treatment with permanganate of potassium was suspended, and replaced by canterization with nitrate of silver. The cornea, which up to that time had remained intact, became infiltrated and commenced to soften. The following day, after the use of permanganate was resumed, the cornea had recovered its resistance, and twenty days after had become completely transparent.

The second case, a child of twenty-five days, was cured by a 10% solution.

In the treatment of abscess and purulent catarrh of the lachrymal tract the author has employed daily injections of a 10% solution of permanganate of potassium ; he has obtained very rapid cures in all the cases.

Dr. Vian has also used a 2% solution of permanganate of potassium in infectious keratitis without hypopyon, but the result has not been conclusive.

On the Ocular Complications of Diabetes.

DR. KOENIG (Paris).—Diabetes causes numerous disturbances of the visual apparatus. The most frequent are weakness of accommodation, sometimes paralysis, and opacities of the lens. In 500 cases which I have examined at Vichy I have found 56 cases of eye trouble—about 11%. In this number there were 10 *cataracts*. Among the other principal lesions I found 20 cases of disturbance of *accommodation*, 2 cases of hemorrhagic glaucoma, one of which was followed by death, 2 cases of *gangrene* of the lids, and 2 cases of chronic *general encephalitis* of the convexity, one followed by death at the end of two months. The diabetic cataract is usually soft and milky in appearance, but in old people it resembles the ordinary senile cataract. Among the complications which follow operations I have observed œdema of the lids and peri-orbital neuralgia.

The *retinitis of glycosuria* is characterized by the presence of little apoplexies and of some white exudation. The predominance of this last, and its occurrence in the region of the macula, indicate the presence of albumin in the urine. Differentiation between these two forms of retinitis is, then, impossible. This statement has great importance from a prognostic point of view. If the optic nerve is in-

volved, it becomes discolored, and simply undergoes white atrophy without œdema. Two of my patients having atrophy of the optic nerve presented these interesting peculiarities: the first, aged fifty-four years, had a brother who was blind as the result of atrophy; the second, aged six years, passed 57.2 gr. of sugar per litre.

Operative Asepsis; Instruments and Dressings.

DR. DESPAGNET (Paris) exhibited a hot bath for sterilization which accomplishes at the same time sterilization in boiling water and in dry air at 180°. Superheated steam under pressure heats the upper apartments used for the dressings, while the instruments are sterilized in the lower compartment in the boiling water.

Dr. Jocqs does not think that it is necessary to practise as strict asepsis in operations on the eye as in abdominal operations.

Dr. Chibret.—These hot baths are complicated and costly instruments. Dry heat gives no security. It is very much better to use cyanide of mercury in solution, which enables us to realize the disinfection of instruments in a practical and economical manner.

Dr. Morax.—The reproach cast by Dr. Chibret on the procedure of sterilization by dry heat forces me to enter a protest. This procedure, the efficiency of which it is not necessary to demonstrate, is in constant use in the laboratories. It has great advantages; it does not oxidize the instruments, and it does not alter the edge; it is absolutely efficacious. The only inconvenience consists in the difficulty which one encounters to obtain a sterilization in air of uniformly the same temperature; this ought not to exceed 180°. The oscillations from 180° to 220° or higher may alter the instruments. In order to give more stability to the temperature, and to cause an equal distribution of the temperature as far as possible, I have had constructed, by Mr. Major, a hot-air sterilizer, the double walls of which contain sand, and the interior wall is closed by a metallic covering, a poor conductor of heat.

When one has obtained an interior temperature of 170° the gas which is used for the heating can be turned off. The interior temperature is maintained, thanks to the sand, during twenty minutes, near 170°, without being again heated.

Dr. Vacher.—I am accustomed to use chloroform for the sterilization of instruments. It is a very practical way.

Dr. Galezowski.—We give so much importance to the sterilization of instruments; it appears to me more important to sterilize the surrounding air.

Bacteriological Research in Empyemas of the Lachrymal Sac.

DR. MAZET.—To avoid, as far as possible, causes of error arising from the conjunctiva or the nasal fossæ, one should examine only the lachrymal suppurative product free from all contamination. In all cases the pus should be collected from the centre of the sac by an external puncture through the skin.

The affections designated by the names of phlegmonous dachryocystitis, inflamed lachrymal tumor, and lachrymal tumor are only varieties of empyema of the sac.

These empyemas may now be grouped under two principal classes :

1st. Acute phlegmonous empyema.

2d. Sub-acute encysted empyema.

Acute phlegmonous empyema results from infection caused either by streptococci or colibacilli.

Encysted empyema is the result of infection from the staphylococcus most frequently, or from some pathogenic bacillus.

These microbes are very frequently associated with various saprophytic bacteria.

Further researches, performed under the same conditions, will show whether other microbes are instrumental in the pathogenesis of empyemas of the sac. They may also enlighten us as to the frequency with which a sub-acute empyema is transformed into a phlegmonous empyema under the influence of secondary infection.

Enlargement of the Erect Ophthalmoscopic Image in Ametropia.

DR. VIGNES (Paris).—*Emmetropia*.—By likening the ocular optic system to a lens, the enlargement of the visual ophthalmoscopic image is obtained by the well-known formula—

$$G = \frac{-(D - d)}{g''} \quad (1)$$

in which D is the distance of the examiner's eye from the visual image, d that which separates the eyes of the examiner and the examined, g'' the distance of the second nodal point from the retina.

Ametropia.—Giraud-Teulon (Academy of Sciences, 1869) showed that the retinal images of emmetropia and ametropia are of the same size, on condition that the correcting glass coincides with the anterior

focal plane of the ametropes. In this case the second nodal point is displaced by an amount equal to the distance which separates the retina from the second principal focus.

If it were possible to give this position to the correcting glass in making an ophthalmoscopic examination, the enlargement of the ophthalmoscopic image would be the same in ametropia and emmetropia; there would be no reason for going further.

But in practice, as the ophthalmoscope is applied before the examiner's eye, the correcting glass is always at a greater distance from the examined eye than the length of the anterior focal distance. Then the second nodal point is still displaced from the point where the correcting lens, placed at φ' , had brought it by a quantity x proportional—for an invariable distance—to the strength of the lens used.

The formula (1) becomes

$$G = \frac{-(D - d)}{g'' \pm x} \quad (2)$$

and shows that the enlargement in the ametropic eye diminishes with the increase of x and increases inversely.

If it is observed that in the combined system (eye and lens of the ophthalmoscope) $g'' \pm x$ is the distance of the second nodal point from the retina, a quantity equal to the first principal focal distance, the formula

$$\Phi = \frac{f'' \varphi'}{(f'' + \varphi') - d}$$

furnishes all the facts required for a knowledge of the enlargement of an ametropic eye corrected with a lens of focus f'' , and placed at a distance x from φ .

Numerical examples :

$$\text{1st. Emmetropia. } G = \frac{-(D - d)}{g''} = \frac{300 - 30}{15} = 18$$

2d. Ametropia corrected by a lens of 100 millimetres focal distance (f''), distant 15 millimetres from the principal anterior focus of the eye (φ').

$$G = \frac{-(D - d)}{g'' + x} = \frac{300 - 30}{23.5} = 11.8 \text{ when } x \text{ is positive—that}$$

is, a hypermetropic eye of about 11.7 dioptries.

$$G \text{ Am} = \frac{(D - d)}{g - x} = \frac{300 - 30}{8.5} = 301 \text{ when } x \text{ is negative, and}$$

there is myopia of 8.36 dioptries.

Irrigating Apparatus for the Eye.

DR. DARIEX (Paris).—Aspiration is produced by a tube and canula analogous to those of Redard's apparatus. For irrigation, propulsion of the fluid is obtained by a small elastic rubber sac fixed to the apparatus, and which is easily filled with an ordinary syringe by means of a slight adjustment. The irrigating current is regulated by a small cock placed at the entrance of the pouch, and which is manipulated by a slight movement of the finger.

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of May 2, 1895.

A New Operation for Ptosis.

MR. MULES has already described this operation at the last International Ophthalmological Congress, held at Edinburgh in August, 1894.

The principle of the operation consists in the substitution of the frontal muscle for the elevator of the upper lid by fixing the first muscle to the border of the lid by a permanent metallic suture. Of all the metals experimented with, silver has given the best results.

Mr. Argyll Robertson heartily approves of the principle of the operation, but fears that the presence of the silver wire would produce too much palpebral irritation if left in place for any considerable time. In his opinion, there is as yet no perfect operation for ptosis.

Blood Spots on the Cornea.

MR. TREACHER COLLINS has observed spots on the cornea of a greenish-red color, due to the presence of refractive granules scattered through the stroma of the cornea.

The seat of these granules was not determined, and had no definite relation with the spaces between the lamellæ of the cornea. Spectroscopic study and chemical reactions led to the belief that they were composed of hæmatoidin.

In some cases, there was associated with hæmatoidin a substance which, on chemical examination, showed the presence of iron; this was, without doubt, hæmosiderin.

In eyes thus affected, the ocular tension was generally increased, and the escape of fluids from the angle of the anterior chamber was hindered by an accumulation of blood corpuscles. Primarily, there must have been a simple diffusion of hæmoglobin into the cornea through the membrane of Descemet, and the hæmatoidin, which is insoluble in the corneal fluids, was thus precipitated. At that time the entire cornea was invaded by the process, and it was difficult to distinguish this condition from a total hypohæmia.

The absorption of the hæmatoidin granules commenced at the periphery and extended in all directions, so that at that time there was a narrow, clear corneal corona. The appearance was, then, that of a lens dislocated into the anterior chamber. The discoloration continued afterwards.

Mr. Jessop has recently seen a case in which, after an injury, the anterior chamber was completely filled with blood. The cornea also contained blood in its interior. In three days all had disappeared.

Mr. Collins thinks this case altogether different. In his opinion, this was simply a diffusion of the coloring substance of the blood through the proper corneal substance.

A Grave Hemorrhage of the Surface of the Palpebral Conjunctiva of Sudden Occurrence.

MR. JESSOP treated a woman, twenty-seven years of age, who was brought to St. Bartholomew's Hospital in a condition of serious collapse, due to repeated hemorrhages in the left eye. The pulse was 130, small, irregular, and the number of pulsations difficult to count. The extremities were cold, and the right pupil dilated.

On everting the left lid, a small ulcer was found with festooned edges, $1\frac{1}{2}$ millim. in diameter, situated in the middle of the palpebral conjunctiva, and from which there was an abundant flow of clear arterial blood. The ulcer was cauterized and cold compresses applied. With the exception of a slight recurrence, the blood-flow was completely stopped.

Fourteen years before, the patient had had erysipelas of the left eye and nose, and since that time the left lid had always been slightly swollen. This young woman had never had hemorrhagia, and nothing in her past history suggested hæmophilia.

She had been married for one year, and was seven months pregnant.

This was, then, without doubt, an aberrant and unknown nævus. There is no such case in literature.

Mr. Stephenson had seen a severe conjunctival hemorrhage occur

from time to time in a girl eleven years of age with trachoma, who had been operated upon *by expression*. This hemorrhage continued for more than five months.

The child was frequently examined at the commencement of the hemorrhage, and it could never be discovered in her case where was the point of escape of the blood. The conjunctiva was uniformly red and turgid.

There was no trace of anæmia, purpura, or scorbutus, and the idea of hæmophilia seemed impossible, since extraction of a pre-molar had not been followed by excessive hemorrhage. At this same time there was swelling of the knee joints, which was renewed three times, but only lasted a few days.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Beitrage zur Augenheilkunde

Reviewed by Dr. VAN DEN BERGH.

I.—Education of the Sight in an Intelligent Person Twenty-six Years Old Who Was Born Blind, by Dr. FRANCKE, Assistant at the Ophthalmological Clinic of Greifswald.

The patient, who had double congenital cataract with pronounced nystagmus, was examined and interrogated with care before the operation. He remembered that in his infancy he had taken part in the games of his age, and that he had played with trumpets, drums, and guns. Later, he entered an institute for blind children, and there learned to read, to calculate, and to sing.

His touch was of incomparable fineness, and by means of this sense he had acquired a very exact conception of the form of objects. Although he could not count fingers, he could determine the linear dimensions of objects brought quite close to his eyes from the shadow which they threw. He also had an idea of distance, which was easily verified with the flame of a lamp. He simply calculated the distance somewhat short, and made the same mistake in the same proportion when he tried to determine the length of a stick after touching it.

The patient was operated on December 20, 1893, by Professor Schirmer, and had a relatively feeble visual acuity, only counting fingers at first very near by, and later, at the end of four months, at 30 centimetres.

The author compares the progress of the education of sight in his patient by that observed by Drs. V. Hippel, Hirschberg, and Uththoff in children from four to seven years of age operated upon by them. There is one fact to be noticed: the children all had a higher visual acuity, a circumstance due, probably, to the lateness of operative interference in Francke's adult. But, in spite of the inferiority of vision, this patient progressed much more rapidly than the children, on account of his facility in learning and retaining the names of objects. At first he did not recognize by sight objects which he knew by touch, but it was sufficient to name them to him a single time for him to easily remember them in future experiments.

The children required a longer time. One experiment is very curious. When a mirror was given to the patient for the first time, he said, "I think that it is an image;" then afterwards, "I think it is a mirror," and then he was immediately conscious that the image before him was his own. In the case operated upon by Uththoff, a boy seven years of age, whose vision was such that he could recognize at 3 metres a piece of paper 2 centimetres square, it was necessary to show him the mirror several times before he learned to recognize it, and it required still more trouble to teach him that the mirror reflected his own image. Four weeks of daily prolonged experiment hardly succeeded in inculcating this idea. Another peculiarity worthy of remark is that when either a doll or a photograph was shown to the children it was clear that they did not take into consideration the reduced dimensions under which the human figure was presented to them. When they were asked to put the finger first on the hair and then on the mouth of the reproduction, they marked a distance as if it had been a figure of natural size. The author's patient, on the contrary, was able to account exactly for the reduction.

The influence of intelligence and reasoning on the education of sight is clearly seen from these examples.

Contrary to V. Hippel, Chesselden, Wardrop, Franz, and the majority of authors, who claim as an established fact the initial absence of the sense of depth, the author is convinced that in his patient this sense existed in a manifest degree. Perhaps the vague notions which the patient had acquired on this subject before the operation were a great aid to him.

One peculiarity which the author's patient had in common with the majority of similar cases was the difficulty in recognizing the

relief of objects. Thus, for a long time he confounded a true egg with an oval figure of equal dimensions placed on paper.

Even at the end of six months he could not tell which was the greater of two objects, of different dimensions, but unequally separated from the eye, so as to fall on the retina with the same visual angle. The author's case differed in this respect from Uththoff's case. Uththoff's child could make this distinction with both eyes, but made mistakes with one eye alone.

II.—Historical and Experimental Studies of the Origin of Myopia, by Dr. ASCHER (Frankfort).

The author considers the history of this question. Until the time of von Arlt, who was the first to notice the elongation of the optical axis as anatomical cause of myopia, the author tells us nothing which is not contained in the classic treatise of Donders. I should, however, mention this fact, not mentioned by Donders, which is that Aristotle asks, "Why do myopes press the lids together?" and, which is more suggestive; "Why have they a small handwriting?"

The author also tells us that, according to Mauthner, Leonardo da Vinci knew of the dark chamber a long time before Porta.

He also brings to mind the forgotten fact that Guérin (Lyons), in his treatise on diseases of the eye (1769), gives as cause of myopia a "weakening" of the posterior pole of the eye and elongation of the optical axis due to ectasias.

Turning then to the origin of myopia, Ascher states that from antiquity until the present day the application of the eyes at short distances has continued to be regarded as the determining cause of the anomaly. But opinion is no longer unanimous as to the mechanism which explains why near vision will provoke elongation of the optical axis.

The three current theories, that of convergence, that of accommodation, and that of compression by the superior oblique (Stilling's theory), are then reviewed. The author considers the criticisms of these theories. He thinks that neither the one nor the other of these three theories is to be rejected. All are defensible, but none has reached the height of a truly scientific theory.

The author had hoped to be able to shed some light on these disputed questions by experimenting on young rabbits, with the aim of comparing the influence of strong convergence and that of prolonged spasm of the accommodation. For this purpose, he operated upon the eye in some, making an exaggerated convergence by advancement with shortening of the internal rectus, and in others by producing an exaggerated tension of accommodation by instillations

of pilocarpine. These experiments, performed with the greatest care, produced no result. Although the animals were in process of growth, the eye experimented upon did not elongate any more than its mate, which played the rôle of witness.

The author was not able to experiment on the effect produced by an exaggerated pressure on the eyeball from the superior oblique. But he is convinced that if the lateral pressure exercised by the recti muscles in the experiment performed by him had no influence on elongation of the optical axis, transverse pressure from the superior oblique would have no more effect.

In conclusion, the author's experiments, without in the least advancing the question, have put one more weapon in the hands of the adversaries of the three current theories.

III.—A Case of Traumatic Ophthalmoplegia with Recovery, by Dr. VOSSIUS.

A youth, seventeen years old, inadvertently received a cut from a foil without a button. The skin $\frac{1}{4}$ centimetre below the lower left orbital border was cut to the extent of 1 centimetre. The wound was superficial, and did not extend beyond the skin. There was diffusion of blood in the lower cul-de-sac and pain on pressure over the trochlea.

In spite of the benign appearance of the injury, there was ptosis of the upper lid; the eyeball, without protruding, was immovable, with the exception of a slight outward movement; accommodation was completely paralyzed; the pupil was dilated and without reaction; diminution of vision in the right as well as in the left eye.

Nothing was found on ophthalmoscopic examination.

How is this ophthalmoplegia to be explained? The cause was necessarily peripheral, acting by compression on the trunks of the ocular nerves. Two suppositions are possible: either the symptoms of compression were due to simple intra-orbital blood effusions or to a fracture of the orbital vault with displacement of the fragments.

The absence of protrusion of the eyeball is against the first supposition. As for the second, it seems much more probable, since at the time of the accident the patient had fallen into a faint, had vomited, and had a sub-conjunctival effusion of blood, which, under the circumstances, might have a special significance.

The diagnosis was, however, reserved.

Recovery was slow, but progressive.

At the end of a month and a half improvement was such that the young man was able to return home.

He returned about six months after the accident. Vision in both

eyes had become normal, and the ophthalmoplegia had left no other traces than a very slight paresis of the superior rectus and a slight mydriasis and paresis of accommodation.

From the total disappearance of the paralytic symptoms, the author concludes that there was a fracture of the orbit without displacement of the fragments, and that the compression on the two optic nerves and the left temporal ophthalmoplegia is explained by a slight hemorrhage into the osseous canals which contain the nerve trunks.

IV.—Unusual Ophthalmological Cases, by DR. AHLSTRÖM
(Gothenburg).

1. *Traumatic Aniridia with Integrity of the Lens.*—Rupture of the sclera situated above and slightly below, about 2 millimetres from the sclero-corneal border, extending to a quarter of the corneal circumference, and caused by a blow of the fist. Total absence of the iris, not the least trace of which remained in the wound. Recovery with integrity of the lens. Normal vision. The author has been able, in the eye of this patient, to study the manner in which the ciliary processes act. Neither before nor during accommodation do they touch the border of the lens. During accommodation they advance, pressing against each other. An instillation of atropine causes them to retract back of the position which they occupy in relaxation of the accommodation, an evident proof that even in a condition of repose of the eye the ciliary muscle is in a state of relative contraction.

The author then reviews the theories of von Arlt, Zehender, Manz, and Hughes on the origin of scleral ruptures, and discusses the points in which his case supports one or the other of these theories.

He also endeavors to explain the way in which the injury produced total iridodialysis.

2. *Double Congenital Ptosis with Immobility of the Eyeball.*—A young man of fifteen years. Accommodation and pupillary reaction intact. There was then external congenital ophthalmoplegia.

The author concludes that the anomaly was due to an arrest of muscular development rather than to a nuclear lesion.

The ptosis was operated upon successfully by Birnbacher's method.

3. *Tumor of the Optic Nerve.*—Myxo-sarcoma in a girl twelve years of age. Enucleation of the eyeball with extirpation of the nerve at the optic foramen.

Centralblatt für Praktische Augenheilkunde

Reviewed by Dr. V. MORAX.

*January.***I.—A Piece of Copper Fixed in the Retina for Ten Years; Considerations on Impregnation of the Retina with Copper, by Dr. W. GOLDZIEHER.**

A youth of eighteen years came for consultation on account of myopia. Goldzieher found in the right eye a slight opacity of the anterior surface of the lens, situated in the pupillary field, and a limited disturbance of the corresponding portions of the lens. The iris and the cornea were normal. When the eye was illuminated with a brilliant light a peculiar metallic reflex could be seen with the naked eye. With the ophthalmoscope some punctiform opacities of the vitreous were seen, which, however, did not prevent exploration of the fundus of the eye; the disc and the vessels were normal. Somewhat outside of the macular region, orange or reddish spots were seen, of small size, situated in the superior layers of the retina; there were, however, no pigmentary modifications, and the choroid had not been altered. In the centre of the retinal zone, thus altered, appeared a foreign body with a metallic reflex projecting from the retina. Vision was $\frac{2}{3}$ after correction of myopia of 2 D. The patient remembered that ten years before he had received an injury from a gun-cap which had necessitated medical treatment for some time.

This is one more case in support of Leber's theory, which is that fragments of copper do not cause sympathetic ophthalmia unless they are septic. In this case, the metallic reflex in the fundus of the eye, when the pupil was dilated, was due to an impregnation of the retina with copper, but there has as yet been no histological study of such cases.

Goldzieher discusses the nature of the chemical process which caused this special reflex. Is there a deposit of oxide or of reduced copper? Experiment alone can solve this question.

II.—A Case of Melanotic Sarcoma of the Ciliary Body, by Drs. J. HIRSCHBERG and A. BIRNBACHER.

A woman fifty-nine years old had in the lower portion of the anterior chamber a brown mass which had pushed the insertion of the iris upward. In this case, as in the cases of Iwanoff, von Græfe, and Hirschberg—that is to say, in all the published cases of sarcoma of the ciliary bodies—the new formation exhibited itself by detaching the circumference of the iris and the corresponding deformation of the pupil.

Histologically, this was a sarcoma of mixed cells (round and fusiform) with pigment granules free or in the protoplasm of the cells. The tumor seemed to be developed between the middle and internal layers of the choroid.

III.—Paralysis of the Abducens with Pneumonia,

by Dr. C. H. WESTHOFF.

A child two years and a half old, with pneumonia in the left apex, presented, three days after the commencement of the pulmonary affection, a total paralysis of the sixth nerve of the right eye, which recovered spontaneously in three weeks. The paralysis was greater at the time when the pulmonary affection was in its acme, and improvement progressed in proportion to the reabsorption of the pulmonary exudate. The author compares this case to diphtheritic paralysis, and thinks that the lesion was caused by a toxine.

I am rather inclined to think that this was a manifestation of meningitis, since meningeal localization is a fact of frequent occurrence, especially in pneumonia of the apex; and besides, these meningeal lesions from the pneumococcus may recover in a perfect manner.

IV.—Tattooing of the Cornea to Improve Vision, by Dr. O. LANDAU.

In a case of central leucoma vision was markedly improved by a simple tattooing of the leucoma.

February.

I.—On a Case of Double Paresis of the Sixth Nerve Following Diphtheria without Other Ocular Disturbances, by Dr. BLOCH.

A child seven years of age, three weeks after the commencement of a rhino-pharyngeal diphtheria, developed paralysis of the velum palati, which lasted for about one month. One week after the recovery of the paralysis of the velum palati, diplopia suddenly appeared, with vertigo and deviation of the eyeballs. Examination proved the absence of pupillary and accommodative disturbances, and the existence of an alternating, converging strabismus with homonymous diplopia. On looking to the right, fixation was made with the left eye, and reciprocally. This double paresis with strabismic deviation lasted for fifteen days, and then the strabismus disappeared, and diplopia only remained on looking obliquely. The peculiarity of this case was the absence of paralysis of accommodation.

In seventeen cases of paralysis of the sixth nerve following diphtheria, seen at Hirschberg's clinic, Bloch has found five cases of paralysis of both external recti associated with double paralysis of accommodation, six cases of paralysis of one external rectus with

double accommodative paralysis, one case of unilateral paralysis of the external rectus and of the accommodation, two cases of paralysis of the external recti without accommodative paralysis, but this had existed before the diphtheria. Finally, three cases of paralysis of the external rectus alone, in two of which the paralysis was bilateral.

II.—Aspiration of a Traumatic Cataract with Successful Results, by Dr. O. LANDAU.

An opacification of the lens developed in a man twenty years of age after an injury with penetrating wound of the cornea. Ten days after the injury, increase of intra-ocular tension necessitated interference. Paracentesis was performed with a lance-shaped knife, the capsule was opened with capsule forceps, and a small portion of the cortical masses removed; but after this interference the reabsorption was not fast enough, and the paracentesis was repeated, and this time aspiration of the crystalline substance was made with Teale's aspirator. Perfect recovery without reaction.

March.

I.—Irritation of the Eye; Three Reflexes Caused by Irritation of the Trigemini, by Dr. A. MOLL.

In almost every active inflammation of the anterior portion of the eyeball several symptoms are observed which we call "irritation of the eye," and which are characterized by contraction of the pupil, lachrymal hypersecretion, and contraction of the lids. It is the first branch of the trigemini which transmits the centripetal excitations to the nerve centres. What is the centrifugal route? If we first consider the lachrymal reflex, it will be found that certain authors consider the lachrymal branch of the trigemini as the secretory nerve of the lachrymal gland, and make this function dependent on the fifth nerve. Brücke, and afterwards Reich, disagreed with this theory. More recently, Goldzieher has endeavored to show that the secretory fibres come from the facial. These fibres reach to the lachrymal gland either by the malar nerve anastomosing sub-cutaneously with the spheno-palatine ganglion, and consequently in relation with the great superficial petrosal, or by recurrent fibres from the *corda tympani*. Uhthoff and Jendrassik have reported cases in which after a complete facial paralysis tears were only produced on the non-paralyzed side. But experimental physiological demonstration has yet to be made. Neither do we know the position of the secretory centre, which, according to Exner, is situated in the neighborhood of the calamus. Blepharospasm is also a reflex phenomenon, whose centripetal route is by the first branch of the trigemini, and the centrifugal route by the orbicular branch of the

facial. As for what Donders has described as sympathetic blepharospasm (occurring in one eye when the other eye has irido-cyclitis), it may be explained by the law of symmetrical reflexes.

As for pupillary contraction following irritation of the trigeminus, opinions are various, as they also are on the question of enervation of the iris. Some claim that the common oculo-motor alone acts on the pupil, others that the trigeminus and oculo-motor both send fibres to the iris.

But these two theories may be reconciled by granting that fibres from the trigeminus join with vaso-motor fibres for the vessels of the iris. Irritation of the sensory centripetal fibres of the trigeminus will be transformed, in a centre whose position remains to be determined, into a centrifugal stimulation of the vaso-motor. Clinical and experimental facts accord perfectly with this hypothesis.

II.—**Cortical Cataract**, by Dr. J. HIRSCHBERG.

From 1871 to 1873, Hirschberg operated on 168 eyes in 99 patients for cortical cataract. Of this number not one eye was lost. In the presence of a cortical cataract there is choice between three different methods: First, by doing nothing; abstention is more important than is supposed, and when vision is $\frac{1}{4}$ or $\frac{1}{2}$ Hirschberg always advises against interference. Second, iridectomy; this is only useful in case of pupillary occlusion, and its value has been much exaggerated. Vision is rarely improved by iridectomy; and, besides, many children with cortical cataract are myopic, so that it is better to remove the lens. Third, discission or extraction of the lens; discission gives very good results, and vision is much better after flap extraction. Hirschberg only performs flap extraction if his patients are over twenty years of age. It is exceptional to see increase of tension develop after discission. In this case it is sufficient to make an incision with a lance-shaped knife and evacuate a portion of the lens mass.

III.—**On Sympathetic Ophthalmia**, by Dr. J. HIRSCHBERG.

The fundus of the eye in sympathetic ophthalmia has a special appearance. There are clear spots in the periphery of the retina, which have a great analogy to specific lesions, and which reproduce more or less exactly the lesions in the injured eye. If it is considered that anatomical examination of the injured eye shows lesions quite similar to those of tuberculosis (giant cells and granulation tissue), it may be supposed that the cause of sympathetic ophthalmia is an organism causing granulation lesions (bacillus), and not a pyogenic organism (coccus). The fact that the affection develops in from three to twelve weeks is in accord with this hypothesis. As

for the route followed, we do not know what it is unless it is the optic nerve, the ciliary nerves, and the vessels. Perhaps sympathetic fibres will be discovered connecting the two eyeballs.

The case which serves as a basis for this theory is quite peculiar. A girl, six years of age, injured her left eye with a knife. Three weeks after, there was lachrymation in the right eye. The child was brought to Hirschberg's clinic six weeks after the accident. In the left eye was found a wound of the limbus with adhesion of the iris. The fundus of the eye was normal; the child counted five fingers at five metres. In the right eye, there were precipitates on the posterior surface of the cornea, pigmentary deposits on the anterior surface of the lens, a slight disturbance of the vitreous, and circumscribed white spots in the periphery of the retina—in fact, the signs of irido-choroiditis with slight reactionary symptoms. Five months after, the lesions were almost identical in both eyes. In October, 1894, the injured eye had better vision than the other.

It may be asked whether these were true sympathetic symptoms, and it is astonishing that Hirschberg has not at least discussed the hypothesis of a coincidence.

IV.—A Vaccine Affection of the Eye, Not Formerly Described,
by Dr. PURTSCHER.

A woman, thirty-three years old, had on one side cedema of the lids and swelling of the pre-auricular ganglia. There was found in the upper cul-de-sac an cedematous swelling of the conjunctiva. Over this swelling was seen a series of gray points looking like grains of sago. There was no real ulceration. Slight chemosis and no secretion. The disease was cured in a few weeks. Purtscher thinks that this was a vaccine ophthalmia, because thirteen days before the beginning of the ophthalmia this woman's child had been successfully vaccinated.

IV.—BOOK NOTICES

BOOKS AND THESES

A Simplified Cataract Operation, Method of Dr. A. Trounseau, by Dr. TENNAUT. (*Thesis of Paris, 1894.*)

After preparatory sterilization of the instruments with 90% alcohol, and of the operative region with boracic acid or 1:1000 sublimate

solution, and after cocainizing the eyeball, Dr. Trousseau, in cases of senile cataract, performs a superior section of the cornea, without lid retractor, with a von Græfe knife, which serves at the same time to tear or transfix the capsule of the lens. When the section is made the back of the knife is pressed against the lower portion of the cornea, thus aiding the escape of the lens. The operation requires about thirty seconds. At the end of six days the dressing is removed and the patient is able to leave the hospital. This method assures perfect asepsis, and gives great security against prolapses of the vitreous.

The author closes with the statistics, taken from the bulletins of the clinic of Quinze-Vingts, of the last four years in the practice of Dr. Trousseau.—DE BOURGON.

Treatment of Epithelioma of the Skin of the Lids and the Nose with Methyl Blue Combined with Chromic Acid and the Galvano-Cautery, by Dr. DOMEC. (*Thesis of Paris, 1895.*)

In all forms of superficial cutaneous epithelioma, methyl blue seems to have, on account of its marked antiseptic and penetrating properties, a selective action on morbid tissues, either because it acts directly on the specific parasitic element of cancer, or because it favorably modifies the abnormal development of the epithelial cells of the neoplasm. The galvano-cautery and chromic acid remove the necrosed tissue and the secretions from the field of operation, and thus favor the penetration of the methyl blue.

In the forms where the conjunctival mucous membrane, and more especially the lachrymal canals, are invaded, treatment is longer and more difficult, but methyl blue seems, nevertheless, to be of real value in such cases.—VALUDE.

MEDICAL JOURNALS

A Case of Hemorrhagic Glaucoma, by Dr. JOHN DUNN.
(*Virg. Med. Month.*, January.)

M. P——, aged 60. Syphilis in early manhood. On February 24, 1894, patient retired to bed in good health. On arising the next morning he noticed that the sight of his left eye was practically gone. He could distinguish, however, light from darkness. No pain about the eye. No external inflammatory signs.

On March 6 he consulted Dr. Dunn. Tension of the globe normal. Examination showed the fundus of the eye to be the seat of innumerable hemorrhagic areas of greater or lesser size. They were most numerous and largest about the macula. The region of the optic disc was much swollen.

Vision of the right eye was practically normal, although the ophthalmoscope revealed numerous deposits, in some places resembling drops of rain, and in other places they were pearly in color.

Urine, heart, and lungs were normal.

The seat of these deposits was in the choroid, as was shown by the normal visual acuity.

Iodide of potash was given internally. Hot baths to the eye. Irritation to the skin of the temporal region. Under this treatment the swollen condition of the disc diminished considerably, and there was some absorption of the hemorrhages.

On March 25 the eyeball began to pain and to be slightly injected about the corneal margin.

On March 31 the tension of the ball began to get above the normal. Eserine was ordered to be put into the eye twice daily. This produced such pain that after the second instillation the patient refused to have it.

April 2 the eyeball was painful on pressure.

April 3 the cornea had begun to become cloudy, and two small hemorrhagic spots appeared on the surface of the iris. The pupil was not dilated.

April 4 pilocarpine was used twice daily with hot applications to the eyes. The tension had become normal, the hemorrhages on the iris had disappeared, and the eye was less painful.

April 5 the pupil was irregularly dilated and a small deposit of pigment or blood appeared on the iris. The tension was normal, although the eyeball was much injected and there was some tendency to œdema of the bulbar conjunctiva. Pupil responds less actively to light than in the other eye.

From this date till April 16 the symptoms of glaucoma increased and the pupillary deposit grew larger. The tension also was increased.

April 24 numerous small hemorrhagic spots appeared on the iris.

July 15 the redness had left the eye and the hemorrhages of the fundus had almost disappeared. Tension of the ball slightly +. There was no pain. Vision had slightly improved. No swelling about the nerve.

November 15 the patient had suffered no inconvenience in the left eye since July.

Vision had slightly improved.

Pupil attached below at margin to lens.

The tension of the eyeball was practically normal, and there were no more hemorrhages in the fundus of the eye.

The changes noticed in the choroid may have been, according to Dr. Dunn, amyloid in nature, and the hemorrhages may have detached particles of these diseased areas which, carried off by the lymph, might act as foreign bodies. This fact caused the attack of glaucoma, the ultimate cessation of the symptoms, and the relatively benign prognosis.

Vaccinal Blepharitis, by Dr. COHEN.
(*Wiener Klin. Wochenschrift*, 1894, No. 52.)

Since attention has been called to vaccinal blepharitis this disease has been observed everywhere. It is, however, probable that these cases do not yet always receive a proper diagnosis. For the nosography of the disease, I refer to the article by Dr. Schirmer (See *Annales d'Oculistique*, Vol. CVI., p. 189), who has given a very exact description of the characteristic ulceration.

The cases described by Dr. Cohen were observed at Prof. Fuchs' ophthalmological clinic (Vienna). The eruption almost always begins eleven or twelve days after the vaccination of the child from whom the patient acquires the contagion. In one case a sty, preceding the vaccinal blepharitis, was the point of entry.

Why should vaccine produce ulcerations on the lids instead of the typical vesicle? Dr. Cohen thinks that the great abundance of germs in the cul-de-sacs produces a secondary infection. It is, in fact, easy to find the presence of numerous staphylococci and diplococci in vaccinal ulcerations of the lids.—SULZER.

V.—MISCELLANY

CORRESPONDENCE

(Open letter to the *Annales d'Oculistique*.)

Ocular Accidents Caused by Cold.

In connection with the case reported by Dr. Duboys, of Lavigerie,

to the Ophthalmological Society of Paris, and mentioned in the April number of this journal (see p. 247), it may be interesting to learn that serious ophthalmias from the action of cold are well known in the northern part of Norway. They appear at the time of snow-storms, which are frequently accompanied with very severe cold. The Finns, who form the greater part of the population, treat these cases with massage. If this is not performed a short time after the beginning of the ophthalmia, the disease frequently takes a fatal course. In 1888 I had occasion to examine a pastor who had had this disease six months before. Being a member of the Chamber of Deputies, he was obliged to make a journey to Christiana in January. While in the mountains, he was surprised by a snow-storm, and was obliged to pass the entire day outside with his travelling companions. The left eye—the wind coming from that side—commenced at midday to become very painful, red, and swollen. In the evening, when they reached a house, he could not stand the light of a lamp. His companions informed him that he would probably lose his eye; but a Finn arrived a short time after, and being questioned concerning the treatment of this disease, replied that he could promise a cure, and the pastor's companions advised him to trust his eye to the Finn. The latter commenced treatment immediately. After washing the patient's face and his own hands, he rubbed the eye from the centre toward the periphery. Then he folded a handkerchief, covered the eye with it, and commenced to blow through the handkerchief on the eye. He then repeated the massage. The pain subsided quickly under this treatment, and the patient slept afterwards. On the next day the eye was still somewhat red, but vision was almost completely re-established, so that he was able to continue his journey. Except a slight myopia, I found nothing abnormal in the patient's eye. The vision of both eyes was normal.

OLE BULL (Christiana).

ITEMS

Dr. W. Czermak has been made Professor of Ophthalmology of the Faculty of Medicine of Prague.

An Ophthalmological Section of the Medical Association of Georgia was recently organized, with Dr. J. L. Hiers as *Chairman*, and Dr. W. F. Aiken as *Secretary*.

The *Buffalo Medical and Surgical Journal*, which has long been a familiar and welcome visitor to a large circle of readers, is presently to celebrate its semi-centennial anniversary. The *Journal* was one of the first to give to *Annales d'Oculistique* in its new form a hearty welcome, and we sincerely reciprocate its kindly sentiments. Its past history is abundant assurance that it will start on its second half-century with new vigor and interest.

NECROLOGY

Dr. Fano (Paris), former Associate Professor of the Faculty of Medicine.

Dr. Rydel, Professor of Ophthalmology of the Cracovie Faculty of Medicine.

Dr. Maklakoff, Professor of Ophthalmology of the Moscow Faculty of Medicine.

ANNALES D'OCULISTIQUE

Volume CXIII.—Number 6.

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

DOUBLE VERTICAL STRABISMUS AND SYMMETRICAL DEVIATIONS OF DEGREES LESS THAN STRABISMUS

By Dr. **GEORGE T. STEVENS.**

(Continued from the April number, page 232.)

We have already seen that, by virtue of the peculiar insertion of the vertically acting muscles, a condition of esophoria may be induced by excessive tension of these muscles. For example, if the eyes have an unfavorable tendency downward, and a strenuous effort on the part of the superior recti is demanded to overcome this tendency, the eyes may receive an impulse inward, independent of any want of balance on the part of the laterally acting muscles.

This is not only the case in theory—it is not very infrequently the fact in practice. It is in conditions of this kind, but in which there is usually an inequality of vertical tension, that we meet with a class of cases to which I have frequently alluded in former papers. In these cases there exists an esophoria, perhaps of a considerable degree, as shown by the phorometer, yet there exists also an ability to overcome prisms in abduction even greater, and in some instances much greater, than can be overcome in the condition of orthophoria. In other words, with an apparent tendency of the visual lines to deviate

inward, there is an ability to separate them even more than in the case in which no such tendency exists.

Such cases have presented great difficulties to me, for it has been evident that complicating forces were acting to induce the anomaly. A correction of the esophoria under such circumstances, by means of prisms or by operative means, would evidently be contra-indicated, while a correction of the excessive abduction by either of these measures would be equally unsuccessful.

In such conditions, I have in former papers advised the persistent search for hyperphoria; yet, despite corrections for manifest hyperphoria, in a certain number of cases the inconsistent tests remain.

If we take into consideration the fact that such an abducting ability may, and often does, mean that in a passive state the dynamic condition, so far as the lateral muscles are concerned, would be represented by exophoria, and yet that esophoria actually exists, which is induced wholly by the vertically acting muscles, we have an explanation which permits us to expect that by the correction of the inordinate vertical tension consistent tests may result in respect to the laterally acting muscles. And this it is that happens in practice.

But another form of irregular anomaly is even more frequently met with. It is that form in which, with a moderate or quite important grade of exophoria, there is yet restricted abducting ability. For example, a patient may show by the phorometer exophoria 1° , 2° , 3° , or more, and yet not be able to overcome a prism with its base in of more than 2° or 3° , and it may even occur that with exophoria 1° to 2° there is homonymous diplopia. Here, too, I have advised the continued and patient search for hyperphoria, and in many instances the search for this condition and its correction are rewarded by a correction of the inconsistency, either full or partial. There exists, however, a proportion of these cases in which I have been unable to bring about more than an approximate uniformity in the tests by simple hyperphoria corrections.

Here, again, the excessive tension on the vertically acting

muscles of each eye is the cause of the trouble, but it is not a symmetrical excess. There is, in this group of cases, anotropia or katotropia, combined with hyperphoria. When the difficulty of adjusting the eyes for the proper plane, therefore, is great, as it often is, only limited relief is to be expected from the correction of hyperphoria alone.

In some instances of this class I have found it necessary to reduce the upward rotation of both eyes to the extent of 10° or 12° (prism) before consistent lateral tests could be obtained. It is surprising to hear the expressions of relief from some of the patients from whom this great burden of adjustment has been removed.

I have shown (*Annales d'Oculistique*, October, 1892) how the action of the eye muscles affect the expression of the face, and to what an extent a change in the efforts demanded for the adjustment of the eyes may modify the habitual expression; but I have also shown that in certain conditions of the lateral or vertical eye muscles there may be different expressions, depending upon whether the conditions are simple or complex.

I have alluded to these expressions here in order to introduce another characteristic peculiarity, one depending upon these double tendencies of the eyes to deviate up or down. This peculiarity consists in an habitual thrusting forward of the upper or the lower part of the face.

Here again we shall find that the general rules are modified by special conditions. A considerable element of hyperphoria may materially alter the carriage of the head in a given case with anophoria or katophoria, but the rule is very general that with a tendency of the eyes downward (katophoria), there is an habitual protrusion of the chin. A person with downward balance of the eyes prefers to lift the chin to drawing upon the eye muscles; on the other hand, the forehead is habitually advanced in many cases where the eyes are balanced upward. That a proportion of these cases of each variety habitually carry the head in the normal position is true, but it is rare, in extreme cases, unless one eye is permitted to deviate.

This peculiarity of carriage is conspicuously shown in many myopic persons, a fact which, while it is not the purpose of this paper to discuss the etiology of myopia, leads to the remark that in my investigations I have found so great a proportion of myopic cases associated with hyperphoria or with restricted rotation, either in the upward or downward direction, that it appears to me to be quite reasonable to attribute the lengthening of the eye to the extreme tension of the muscles acting in the vertical direction, combined with a condition of the eye itself to be presently mentioned.

In this suggestion I do not forget that von Græfe believed that the tension of the lateral muscles, in the condition which he called "insufficiency of the interni," was to be regarded as an element in the causation of myopia. This view, however, had much less to sustain it, since so large a number of myopes have esophoria, while a large proportion have no extreme degree of either esophoria or of exophoria.

If we accept the view that anomalous action of the ocular muscles may induce nervous reaction, a view which I believe has been so abundantly demonstrated that it is beyond a doubt by those who have become informed on this subject, we may see that a hyperæmic condition of the walls of the eye being induced as a reaction from the condition of hyperphoria, a pressure upon these hyperæmic, and therefore less resisting, walls might easily mold the eye into the myopic form. We may thus have in the etiology of myopia two elements: first, a weakening of the walls of the eye, and second, an inordinate pressure upon them, extending them in the antero-posterior diameter. It is also a fact worthy of notice that the immense sursumduction (often 9° or more, right and left) which is often found in myopia disappears after correction of katotropia in these cases.

I have tabulated many hundreds of cases of myopia, and find that a condition of deviating tendency in the vertical direction of one or both eyes is so general that it may well be regarded as universal.

That such tensions should also induce irregular curvatures of

the cornea, and that such irregularities should at the same time occur so uniformly in certain meridia as to gain for them the appellation of irregularities according to the rule, is also reasonable to suppose.

But the fact of practical and of great importance is that even after the cornea has been thus irregularly developed a proper relaxation of the tension of the vertically acting muscles not infrequently modifies the astigmatism by reducing it, and in some cases of moderate astigmatism the cornea after a short time returns to the regular curvature.

This statement is neither speculative nor exaggerated. It is the summing up of actual experience, and the facts are demonstrated both by the effects of glasses and by examinations made by the ophthalmometer. That nervous disturbances of a general character should arise from these anomalous conditions will be readily understood by those whose experience has led them to recognize the multiform disturbances arising from heterophoria.

Those who have systematically studied the effect of correction of heterophoria have had occasion to meet with instances in which treatment directed to heterophoria has been successful, but only up to a certain point; sufficiently successful to satisfy both patient and physician that the trouble was ocular, yet stopping short of entire relief.

That the conditions under discussion have an important bearing upon a considerable proportion of these cases has been demonstrated in my own experience, for in cases in which the correction of heterophoria has been, so far as repeated tests made at considerable intervals would show, complete, I have been able, on attending to the conditions here discussed, to see the nervous reactions, only in part dissipated by former treatment, disappear entirely.

In order to illustrate the conditions in which there is actual deviation of the eyes, either directly up or down, or in the vertical and lateral plane, and more especially to show the extent to which the action of the vertical muscles may influence lateral

deviations, I shall introduce a few cases in which the deviations are evident.

The first case is one of direct upward deviation of both eyes.

Miss E. M——, aged fourteen, was sent to me by Dr. W. V. White in July, 1894. The girl had been subject to constant headache as long as she could remember, often accompanied with dizziness. The persistent and intense pain in the head at length compelled her to abandon school, yet even when she was not engaged in study there was great distress.

She was found to be a robust girl, with no organ diseased, and with no apparent cause of disturbance except the eyes. Examination of these organs shows: vision of right eye, $\frac{5}{8}$; of left eye, $\frac{4}{8}$, each with + 1.50 spherical.

Excluding either eye, the other deviates directly up 4 to 6 mm., but it is the right eye which generally deviates, or, as her friends state it, "rolls up into her head," while the left eye is usually chosen for fixation. She can, however, fix either eye at will; then its fellow deviates up. When she is fatigued the deviating eye rolls further up than when she is fresh. There is no indication of paresis; indeed, there is ability to rotate the eyes freely in all directions, except that the upward rotation is much greater than the downward.

If a red glass is placed before the right eye and she fixes the left, there is vertical diplopia, right hypertropia 5° to 12° . If the red glass is changed to the left eye and she fixes the right eye, there is left hypertropia, 3° to 8° . In both instances it is easy to see that only a portion of the vertical distance between the images is measured, for the patient can be seen to balance the eyes up and down, and it is evident that to a large extent the location of the images is modified by these movements.

The deviations upward are, in fact, more than would require a prism of 20° for correction, for, even when such a prism is placed with its base down before the deviating eye, and the other eye is excluded, the deviating eye is seen to move down for fixation. It is, therefore, impossible, from the statements

of the patient, to form a correct judgment of the actual amount of deviation of the images.

In moving from deviation to fixation each eye moves down almost exactly in a vertical line, and in returning from fixation to deviation each moves directly up.

The figures 1 and 2 show the position of the eyes: 1, when the left eye is fixed; and 2, when the right is directed to the object.

After examinations, made on four or five successive days, graduated tenotomy was done on the superior rectus of the right eye, and a week later a similar operation was done on the left eye. These relaxations were found to be insufficient to prevent the upward deviations of the eyes, and other careful tenotomies have been done on each of these superior recti since then.

The result has been to correct the deviations to the extent that it can only be perceived when the observer passes a card from one to the other eye and watches carefully for the movement. Each eye, under these circumstances, may be seen to move up very slightly in exclusion, but it has been thought best to permit considerable time to elapse before resorting to attempts at a more perfect correction.

From the first relaxations the pains in the head have become less intense and very much less constant, and the girl has been able to resume her place in school; she is no longer dizzy. It is not to be expected that a complete freedom from headache will be experienced until more exact corrections of the ocular defects are made.

The two following cases illustrate the effects of a strong tendency of the eyes to deviate upward, but to an extent which is unequal, and in which a converging squint results.

Miss R—, aged eleven, was brought to me in April, 1893, her parents expecting me to operate for "cross eyes."

Vision—right, $\frac{2}{10}$ with 4.50 sph.

left, $\frac{2}{10}$ " " "

The left eye turned in in a marked but not extreme manner. It is extremely difficult for her to locate the image with the

left eye, but apparently a prism of 20° base down before the left eye brings the images to the same plane when the right is directed, and a prism of from 10° to 15° accomplishes the same when the left is directed. These results were obtained after very patient examination, renewed on different days during the week. With a prism of 20° with its base down before the left eye, images sometimes unite and at times are also crossed.

Careful study of the case convinced me that the converging squint did not arise directly from the relations of the lateral muscles, and that in fact the probable position of the eyes, so far as these muscles were concerned, was one of divergence. This conclusion was communicated to her parents with the statement that to correct the squint in the ordinary manner, which could be done in a few minutes, would be a misfortune, but that a rational correction might require much time and involve considerable trouble.

The latter course was taken. Careful relaxations of the superior recti have been made, allowing some months to elapse between the operations; there remains a slight deviation of each eye up behind the screen, with the left still rising more than the right. There is an absence of squint except for a moment occasionally, a deviation evidently due to the remaining inequality of the relative tensions of the superior recti. For the most part the eyes appear to diverge, and, indeed, by the phorometer she shows exophoria 6° .

The cut, Fig. 3, indicates the strabismic condition of the left eye at the time of her first examinations, and Fig. 4 shows the absence of any converging squint since the treatment was directed, not to the laterally acting, but to the vertically acting, muscles.

It is not my wish, in introducing such cuts, to intimate that photographs can indicate when a perfect or proper correction for strabismus has been made. These are intended to serve the purpose only of showing that, whereas there existed a marked converging squint, there is now no such deviation, although the interni and externi have remained undisturbed. Neither these nor the two following cuts (Fig. 5 and Fig. 6) have any other



Fig. 1.



Fig. 2.

Fig. 1.—Left eye in fixation, right deviating up.

Fig. 2.—Right eye in fixation, left deviating up.



Fig. 3.



Fig. 4.



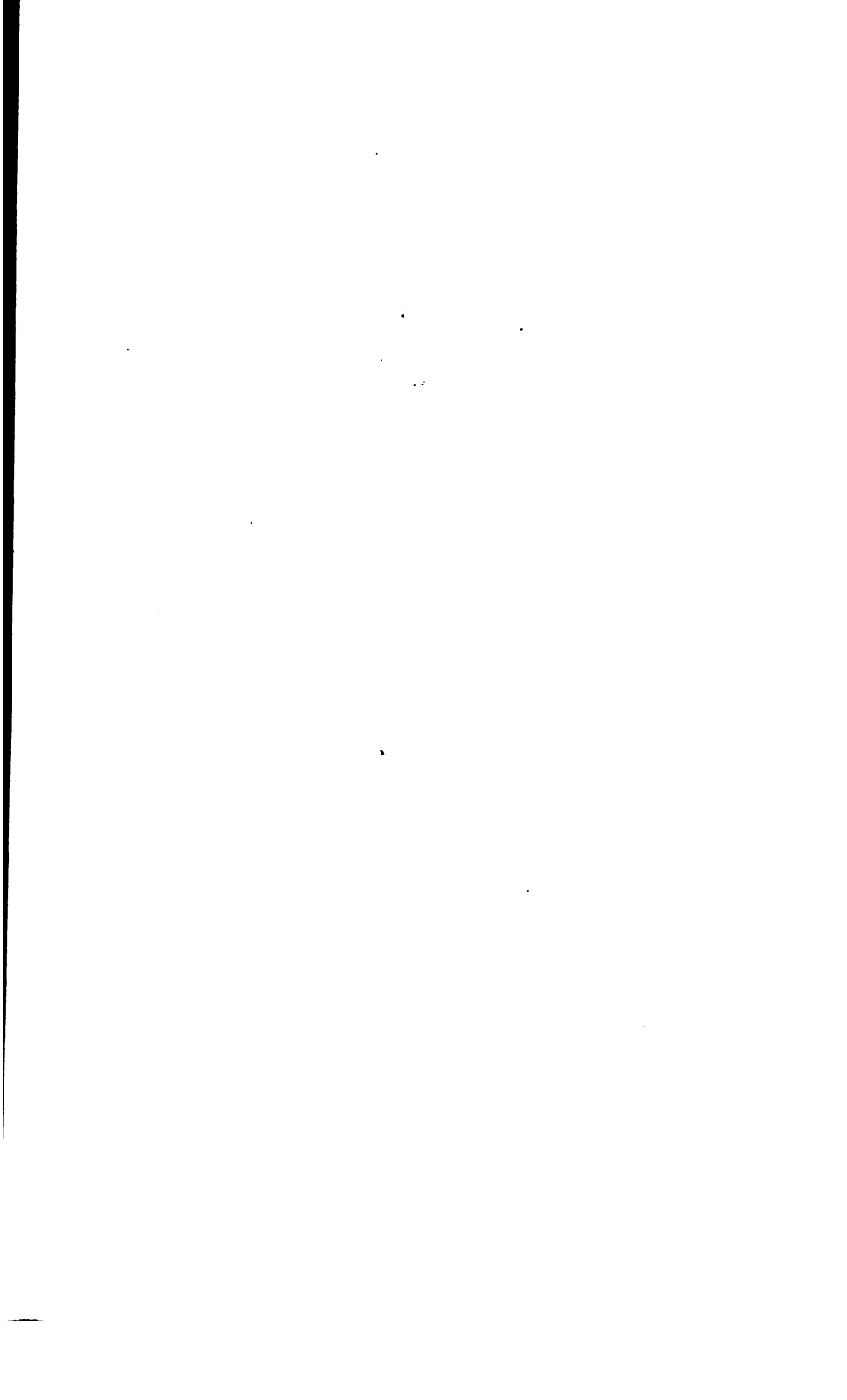
Fig. 5.



Fig. 6.

Figs. 3 and 5.—Cases of converging strabismus depending on vertical deviations.

Figs. 4 and 6.—These cases after treatment directed to the superior recti only.



purpose. They could not be introduced as perfect corrections of strabismus, even if such pictures could ever show such corrections. In both these cases there is much careful work to be done before a complete equilibrium will be attained.

I introduce another illustration of the result of treatment directed to the superior recti in a case of converging strabismus.

Miss L——, twenty-five years of age, was first seen by me in March, 1893.

She had for years been subject to headaches of a most tormenting character.

Vision, each eye, $\frac{5}{8}$ with cyl. + .50 at 90° .

Ophthalmometer shows astigmatism $\frac{1}{2}$ D. with the rule. There was marked but not extreme converging squint, the left eye deviating.

After much practice the patient was taught to recognize the double images when a red glass was placed before one eye. After this recognition it was found that if she directed the right eye, she had left hyperphoria of about 5° ; or if directing the left eye, she had right hyperphoria of about the same extent. As in the former case, these measurements were far short of the actual difference in the directions of the eyes, but were largely modified by the movements which the patient made to bring first one then the other eye to fix the object. Each eye deviated up when in exclusion from 10° to 15° . The photograph, Fig. 5, was taken before any corrections were made.

Very carefully graduated tenotomy was done for each superior rectus, and after a few weeks the operation was repeated on each eye, but, as appeared later, without a full correction of the tendency to diverge up.

The cut, Fig. 6, indicates the absence of converging squint following these operations. When a card is passed from one eye to the other while the patient fixes a distant object, each eye is seen not only to deviate very slightly in the vertical direction, but outward. Thus the converging squint is not only relieved, and the relief has been permanent, but an exophoria is shown, notwithstanding the lateral muscles remain undisturbed.

But it is not only the cases of moderate convergent strabismus which may be corrected by attention to the vertically acting muscles. Cases of extreme deviation yield to similar treatment, and it is probable that a great proportion of cases of convergent strabismus of all grades are the result, to a greater or lesser extent, largely or mainly, of the conditions which I have called anotropia and katotropia.

It remains to return to the consideration of these lesser deviations which are not indicated by any visible deviations.

MYOPIA, CENTRAL CATARACTS, AND CENTRAL LEUCOMAS

By Dr. **ROURE** (Valencia),
Licentiate of Physical Science.

For a long time it has been known that myopia will appear in persons with commencing central cataracts.

In the first half of this century Scarpa called attention to this fact, and explained it by an increase in the size of the lens resulting from the softening which it undergoes.

Drouot also noticed that patients with commencing lenticular cataract brought objects which they examined near to their eyes and became myopic. He found, also, that the use of a mydriatic increased their vision.

Arlt thought that if the capacity of vision was reduced it was dependent upon the interception of the luminous rays by the opaque portions of the lens, thus causing amblyopia.

At the Tübingen clinic, Schleich (1) found in 578 myopes 12 anterior or posterior polar cataracts, 22 zonular cataracts, and 75 progressive cataracts. He also noticed the coexistence of myopia and opacities of the cornea, a fact to which I will shortly recur.

Landesberg (2) describes 5 cases of senile cataract in the de-

(1) Clinical and Statistical Contribution to the Study of Myopia. (*Recueil d'oph.*, 1882, p. 694.)

(2) LANDESBURG: On the Development of Myopia During the Formation of Senile Cataract. (*Centralblatt f. Augenh.*, 1884.)

velopment of which a myopia appeared which was corrected by concave glasses.

Dor, in reviewing this article, remarked that he had frequently observed the same fact in commencing cataracts. He adds that in this case the myopia is only apparent, and after extraction does not diminish the ordinary hypermetropia.

Galezowski (1) also found the same conditions in two cases of central cataract, one of posterior polar cataract, and two of zonular cataract. He thinks that this myopia is real, and that it is due to an increase in the thickness of the lens.

Panas likewise mentions the appearance of myopia, and makes it dependent on an increase in the index of refraction or an increase in the curvature. In zonular cataracts he asks whether the myopia is progressive or is due to an excessive tension of the ciliary muscle and the muscles of convergence.

It will be seen that, until the present time, this question seems to have been neglected by the principal writers, who only incidentally give their opinion on the subject.

Quite recently, in an article published in the *Annales d'Oculistique* (Feb., 1895), Dr. Demicheri explains, under the title of false lenticonus, the phenomenon under discussion by a difference which occurs, in the beginning of cortical cataract, between the refraction of the nucleus and that of the cortex of the lens.

But how, then, is the myopia explained which is ordinarily associated with zonular and polar cataracts? These cataracts are congenital and generally stationary. Consequently, the portions of the lens affected by the process are already completely opacified when we are called to examine them, and the examiner cannot witness the development which modifies the refraction of the lens. How, also, is the appearance of myopia, which so frequently accompanies central leucomas of the cornea, to be explained?

It seems to me that a very simple explanation can be given of these phenomena.

(1) GALEZOWSKI. (*Recueil d'oph.*, 1880, p. 602, and 1882, p. 665.)

I shall consider principally here polar and zonular cataracts, but what follows is equally applicable to every opacity, either of the lens or of the cornea, occupying the centre of the luminous bundle which penetrates the eye.

The explanation which seems to me to be applicable to all these phenomena rests entirely on the following statement :

There is dilatation of the pupil in the majority of persons with central cataracts or central leucomas of the cornea.

This dilatation is very marked in young persons, on account of the greater elasticity of the iris tissue. It is less extensive in aged persons. It is ordinarily quite considerable in persons with zonular cataract.

Vision is effected, in these persons, by the transparent annular portion situated between the opacity and the border of the pupil, but at the expense of myopia, the appearance of which I shall explain.

When the iris occupies its normal position in a normal eye longitudinal aberration may be neglected, since only the central rays penetrate the eye.

If the pupil is dilated, not only the central rays penetrate the eye, but also rays which are, if not marginal, at least less central. The result of this is longitudinal aberration more or less considerable, causing in part the visual disturbance which ordinarily accompanies atropinization.

If, under such conditions, an opaque screen be placed in the centre of the bundle of rays which traverse the media of the eye, this screen will intercept the central rays. Consequently, the focus of the central rays will disappear, and only the focus of the marginal rays will remain.

But, in a converging system, the focus of the marginal rays is further from the posterior nodal point than the focus of the central rays. If, then, the latter is on the retina, the former will be in front of it.

A central cataract plays exactly the same part as the screen, which intercepts the central rays. The posterior focus of the eye will then be displaced in front of the retina. The eye thus constituted will act like a myopic eye—that is to say, it will be ne-

cessary to use a diverging lens to bring the posterior focus on the retina.

The myopia is, then, only apparent, and, as Dr. Dor states, if the lens is extracted it has no influence on the later hypermetropia.

A simple calculation, however, allows us to account for the degree of myopia which may be produced under the preceding conditions.

As the calculation for aberrations in thick lenses is long and difficult, and as I only desire here to obtain an approximation, it will be sufficient to consider what occurs in a uniform refractive medium limited by a spherical surface.

It is known, in fact, that the ocular dioptric system may be reduced to such a system.

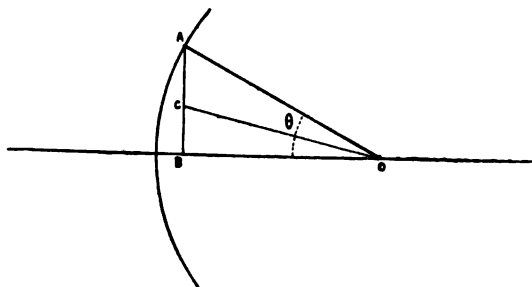
But the principal longitudinal aberration of such a system is given, in absolute value, by the formula

$$\lambda = \frac{R \sin^2 \Theta}{2n(n-1)}$$

an expression which may be written

$$\lambda = \frac{R^2 \sin^2 \Theta}{2Rn(n-1)}$$

R is the radius of curvature of the spherical surface, and Θ the semi-opening of the portion of this surface utilized. But $R \sin \Theta = AB$



AB is the radius of the cylindrical bundle of rays as it penetrates the system; in the eye, it is the radius of the pupil.

The expression for longitudinal aberration then becomes

$$\lambda = \frac{\overline{AB}^2}{2Rn(n-1)}$$

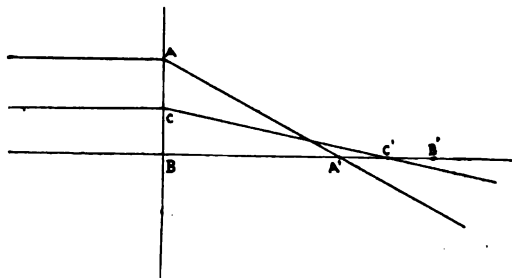
Suppose now that a screen with a radius BC, having its centre in the axis of the system, intercepts a portion of the rays.

The longitudinal aberration will diminish by

$$\lambda = \frac{\overline{BC}^2}{2Rn(n-1)}$$

Its value will be $\lambda - \lambda_1$.

In fact, in the optical system under consideration the marginal rays falling on A will come to a focus in A', the central rays falling in the neighborhood of B will come to a focus in B', and the intermediate rays, such as C, will come to a focus in C', situated between A' and B'.



As a result of the interposition of the screen BC, the longitudinal aberration is reduced to A'C'. But the point in A'C' where the transverse aberration is the least considerable is A'. Therefore, the eye, to have clear vision, is forced to bring this point on the retina.

The distance of this point A' from the retina—that is, the distance A'B—measures the degree of myopia created by the dilatation of the pupil and the interposition of the screen.

It is interesting to notice here that if, in normal vision, the aberration is very slight, it is not so in the actual case. For the preceding formulas show that the aberration is proportional to the *square* of the radius of the pupil, and that to an annular pupillary opening, such as AC, will correspond an aberration *relatively* far more considerable than that which is due to an opening situated in BC, even if $BC = AC$.

This being granted, Listing teaches us that for approximate calculations we may consider the eye as a uniform spherical refracting surface, separating the air from a media with index of refraction 1.43, the radius of curvature of this surface being 5.51 millim.

The formulæ which we have taken to express the aberration are applicable to this case.

If we substitute their values for the letters the desired aberration becomes

$$\lambda = \frac{\overline{AB}}{2 \times 5.51 \times 1.43 \times 0.43} = \frac{\overline{AB}}{6.77}$$

Suppose the pupil to be dilated and its radius equal to 3 millimetres. The aberration is then

$$\lambda = \frac{9}{6.77} = 1.3^{\text{mm.}}$$

that is, the posterior focus of the eye is 1.3 millim. in front of the retina.

It would be easy to show that in this case the eye is myopic to the extent of 3.1 dioptries.

A central opacity leaving between it and the border of the pupil an annular opening, then, explains the appearance of myopia, as is shown by the above cases.

In support of this thesis I will add the following statements, which have occurred to me during the preparation of this article:

1st. Persons with central leucoma of the cornea are, *in general*, myopic. In five patients with central leucomas, recently examined, vision *in all* was improved by concave glasses.

2d. In a young girl with a large central spot on the cornea, occupying the whole pupillary field, and having scarcely $\frac{1}{10}$ vision, dilatation of the pupil with scopolamine and the interposition of a 2-dioptre concave glass brought the vision up to $\frac{3}{10}$.

3d. A man, sixty-one years old, with normal vision in the left eye, and who is a good shot, and always uses the right eye for aiming, has now a central ulcer on this eye with vision of $\frac{1}{10}$. After dilatation of the pupil and the interposition of a 2-dioptre concave glass, vision increased to $\frac{3}{10}$.

4th. Finally, I have made the following experiment : right eye of a patient with hypermetropia of 1 dioptr immobilizing the lids with a blepharostat and dilating the pupil, I made a spot in the centre of the cornea with a needle. It is quite easy thus to obtain an artificial leucoma punctatum comparable to pathological leucomas.

Vision, at first normal, decreased to $\frac{3}{16}$, and then, by the interposition of a 3-diotre concave glass, it increased to 1.

These observations and experiments need to be repeated. However, they agree one with another, and with the results of other experiments, and go to show that the myopia observed in persons with cataract or central leucoma is due to the interposition of the path of the luminous rays of the lens, or corneal opacity.

THE RELATION OF THE AMPLITUDE OF ACCOMMODATION TO STATIC REFRACTION

By Dr. **FROMAGET**,

Chief of Clinic of the Medical Faculty of Bordeaux.

Last year my preceptor, Prof. Badal, had occasion to determine the static refraction and the visual acuity of a large number of students, and requested my excellent friend Dr. J. Javal and myself to assist him in this work.

I took advantage of this rare opportunity to make some investigations on the subject of the amplitude of accommodation, the results of which I will here record.

I am far from being persuaded, as is every one else, that these relations were established in a definite manner by Javal and his pupils.

We are accustomed to hearing it said and repeated that *the amplitude of accommodation is independent of the condition of the static refraction*—that is, that at a given age every normal, emmetropic, or hypermetropic person has an identical amplitude.

On what ground does this affirmation rest ? I have collected for the data establishing such a demonstration in De-

must admit that I have found nothing which prefer to Donders a demonstration which he never

measured the amplitude of accommodation in does not mention it. All the eyes which served for his curve were emmetropic, slightly hypermyopic less than one dioptré.

his exact words in this connection :

use of p in the emmetropic eye was deduced from a series of observations. In Fig. 105 each observation is marked by a point, and the position of these points shows, at the same time, that the deviations of the mean course are not very great. And still these must undoubtedly be ascribed to error in observation; in some, a slight dermopia may also increase the deviations. In the first column of this table, emmetropic eyes were, for the most part, but also eyes affected with a slight degree of M (myopia) were not excluded. These last even deserve to be mentioned. Indeed, in these alone we have, without the aid of accommodation, sufficient security that the near point is not influenced by a latent H, and we may say that, with these degrees of M, $\frac{1}{\lambda}$ is equal to that of the emmetropic eye."

It is seen what were Donders' materials even for the study of emmetropia. It is also seen that latent hyperopia was the cause of several insignificant errors in his observations. But he does not speak of ametropia.

Regarding the slight errors which Donders mentions in his determination of the remote point I should also speak of the method employed by the celebrated Utrecht ophthalmologist in determining the near point.

His treatises designate under the name of Donders' method the determination of the near point the method of using trial glasses."

It is sufficient to consider Donders' work on the amplitude of accommodation in relation to convergence to be convinced that he did not have recourse to a method so inexact.

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and defective. If it is desired to give his name to a method for the determination of the near point, and that would be to me quite just, it would be proper to call *the clinical method of Donders*. That is, in fact, the method Donders employed.

But here is how he describes it himself :

“ The determination of the nearest point is effected by the use of a wire optometer. This consists of a little frame in which some fine black wires are vertically extended, and which, for measurement, capable of being rolled up, is connected, to a handle, commencing at the frame, and the bobbin being applied to the temple, on a line with the anterior surface of the cornea. The bobbin is, by moving the frame out from the eye, used to determine until the vertical wires are seen with perfect accuracy. It is, indeed, possible to determine by means of such wire optometer sufficient accuracy whether they are exactly seen, as by a lateral deviation the margins lose their sharp outlines and the lines of these lines appear. The persons examined, for the most part, state this very easily. The reading of print capable of being distinguished at given distances in due accommodation by a sharp eye, may be used to control the result.”

Whatever be the skill of the observer and the intelligence of the subject, this method is likely to cause errors, which, especially in the near point, produce differences of one dioptre, and even more if, for example, 8 centimetres should be counted instead of 9. This method, which is good because it enables the subject to exert all his accommodative power, is not mathematical.

I considered whether it would not be profitable to first study the researches of Donders by a different and more exact method, and then study the accommodation in the ametropes I had at my disposal.

I determined the static refraction by ophthalmoscopy, and, in certain rare cases of myopia, by the method.

In determining the near point I used an instrument admirably adapted to this purpose—Prof. Badal's optometer.

culated the near point from the anterior surface
I have measured it from the optical centre of

easily done with the optometer by removing the
bringing the subject's eye close to the tube. In
focus of the lens of the optometer is made to coin-
optical centre of the eye. These considerations
efficiently discussed by my friend H. Bordier in
le in the *Archives of Ophthalmology* (September,
I need not return to them now.

tion in visual acuity, which occurs as soon as the
passed, is far easier to control than the moment
of the double contour of the wires in the clinical
ally, and more particularly, the graduation of the
ows one to measure a change of 0.25 D.—that is
tely exact results are obtained.

e conditions I have undertaken these investiga-
y should evidently give, even in emmetropia, re-
at different from those of Donders.

rmained the remote points, and my friend Bordier
s, and the results have been verified by both of
able control is, in my opinion, of sufficient im-
to be passed over in silence.

measured the amplitude of accommodation in 408

students may be thus divided :

metropes	156
opes	179
.	73

ted all cases of astigmatism, and all those with
uity. The age varied from seven to twenty-one
o ten years only hypermetropes were found.
confirm what I found last year in examining sev-
common school children : it seems to me to show
ge hypermetropia is the normal condition of the
ter may be myopic or emmetropic. All this por-

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tion of the curve is, then, new, since Donders only co
at ten years.

The amplitude of accommodation at seven years is, 1
it decreases very slowly to ten years, when it is only
At ten years the curve of emmetropia commences.

The 73 myopes were all from thirteen to twenty-on
age.

Before thirteen years very few were found, but beyon
their number increased as they advanced in the higher

In considering the curves which were traced in taking
ages of all these amplitudes it is easy to see that the thr
ent conditions of the eye have three very distinct curv
curve of hypermetropia is slightly convex upward fr
to ten years, but soon becomes concave upward, to
twenty-one and a half years, 10.3 D.

The curve of emmetropia is inferior. At ten y
identical with that of hypermetropia, but as the condit
fraction is more clearly confirmed, and as the stude
more, the distance which separates them increases
twenty-one and a half years the amplitude of emm
only about 9.5 D., 1 D. less than in hypermetropia.

In myopia the difference is still greater; the curv
2 D. less than that of hypermetropia, and 1.20 less tha
emmetropia.

It will be seen that after fourteen years of age
curves have parallel courses, and decrease in the sam
tions.

The hypermetropia in these students varied from 1
The myopia extended from 1 to 4 D. We disregard
higher degrees of myopia, and all really pathological
examining these weak degrees of ametropia it is well s
ever, what considerable differences exist between the

Here are the exact figures which resulted from the
and which were used in the construction of the curves.

AMPLITUDE OF ACCOMMODATION IN D.

AGES.	H.	E.	M.
7 to 8 years.....	14.33	—	—
8 to 9 "	14.12	—	—
9 to 10 "	14.00	—	—
10 to 11 "	13.50	13.50	—
11 to 12 "	13.50	13.45	—
12 to 13 "	12.95	12.65	—
13 to 14 "	12.41	12.21	—
14 to 15 "	12.48	11.61	10.33
15 to 16 "	11.67	11.25	10.09
16 to 17 "	11.18	10.41	9.75
17 to 18 "	11.11	10.35	9.01
18 to 19 "	10.80	9.83	8.92
19 to 20 "	10.40	9.67	8.40
20 to 21 "	10.36	9.62	8.37

be that in the 408 students examined the amplitude of accommodation varied in a constant manner, according to the static refraction.

Amplitude was the greater in hypermetropia, a mean in emmetropia, and less in myopia. Convinced that as these results were obtained from so many observations they were correct, the investigations were continued with the aid of Dr. Seguin.

Students examined were in general from twenty to thirty years of age, and that the conditions might be similar to those in the previous investigations, students were examined almost exclusively at the remote point in all was determined by keratometer and erect image.

The point was obtained with Badal's optometer under the conditions indicated above.

Observations reached the number of 250 for a period of three months. They proved that the law established did not

change, as in those under twenty, the amplitude in hypermetropia was greater than in emmetropia, and the latter, than that of myopia. The hypermetropia was

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1, 1.50, and 2 D., and the myopia did not exceed 4 D. eyes exempt from all lesions were examined, that the results might be maintained.

Thus, then, on the strength of 800 observations, covering a period of about twenty-one years, it was established in a disputable way that the dynamic refraction varies with static refraction!

But it remained to be proved that this variation was a result of the static refraction. If the remote point is modified by the use of correcting glasses, does the near point vary in accordance with the conditions stated above?

It is not necessary, in solving this problem, to make the tropes wear concave or convex glasses: we have only to examine the amplitude in corrected ametropia.

By this means, as the correcting glass carries the remote point to infinity, the ametropes are thus placed in the conditions of an emmetrope.

The accommodation in a myope of 3 D., for example, is most always at rest, since he does not see clearly beyond 33 centimetres for working, and objects are constantly placed at the remote point, thus dispensing with all accommodation effort.

But his myopia is corrected by a — 3 D. glass, and now, if he wishes to see at this same distance, he will be obliged to make an effort which increases his static refraction by 3 D.

He will be placed in the same conditions as an emmetrope accommodating from infinity to a distance of 33 centimetres.

In hypermetropia the opposite is the case: the accommodation for near work is diminished.

What becomes of the amplitude in corrected ametropia?

It becomes equal to that of emmetropia. This is very clearly shown in the numerous cases which we have examined.

In making a comparative table, as Dr. Seguin has done in his thesis, it is found that all the myopic subjects who wear correcting glasses have an amplitude less than that of emmetropia.

Those, on the other hand, whose ametropia is corrected, have an amplitude equal to that of emmetropia.

even myopic subjects who have the amplitude of accommodation, but this is easily explained by examining the glasses they wear. They have glasses stronger than those for myopia, and hence are made hypermetropic, and accommodation is obliged to comply with the latter condition.

Isometropia sometimes allow the truth of this law to be seen.

A patient at the hospital, had a myopia of 1.75 in the right eye and 1.75 in the left, and wore glasses

which, after this correction, made him myopic to the extent of 0.75 D. in the right eye and 0.75 D. hypermetropic in the left. The amplitude of accommodation was 7.50 D. in the right eye and 7.50 D. in the left eye. The difference found by me at various times was too great to be attributed to an error.

The amplitude in all the older myopic students was much less than that in the younger ones, from the fact that the older ones did not wear correcting glasses or did not wear them properly (under 4 D.). Their eyes were, then, really functioning under the conditions relative to this

condition. In the younger students, on the other hand, almost always wore glasses, and their accommodation increased rapidly with the increase in the proportions.

It can be seen that a person twenty-one years old with myopia has an amplitude superior to that of a person of the same age old with uncorrected myopia.

In spite of the advance of age and the ever-progressing of the lens, not only is the amplitude of accommodation in myopia maintained, but it may even increase.

In hypermetropia it is the opposite. With the use of correcting glasses the amplitude diminishes.

What is the cause of this variation in the amplitude of accommodation? Is it the organ which, as a greater or smaller effort is required to produce more or less work, and which enables

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the eye to strive, not only against the advance of a against the variations of static refraction?

The lens is evidently not to be considered. It is passive accommodation. The active organ is the ciliary muscle.

This muscle cannot, in fact, escape the general physiological laws. The greater the effort required of it, the harder it works, and, as its work is increased, it finally becomes hypertrophied and easily accomplishes an effort which at first is difficult.

The more powerful the contractions, the greater is the effect of refraction which it produces for the eye. The less it works, the less is the accommodation and the more it atrophies.

Clinical physiology is thus in accord here with anatomical researches.

Hypermetropes with a large and powerful ciliary muscle have the maximum amplitude. Emmetropes whose ciliary muscles are of normal dimension have a smaller amplitude. Finally, myopes whose ciliary muscles are pale and atrophied have a minimum amplitude.

But if the contractions of the ciliary muscle increase and diminish, it is hypertrophied or atrophied, and the amplitude increases or diminishes.

ON THE USE OF LARGE SUB-CONJUNCTIVAL INJECTIONS

By Dr. **L. de WECKER.**

There can be no doubt now that a period of reaction will come as successor to the phase of enthusiasm aroused by the announcement of the effects obtained by sub-conjunctival injections. Such, indeed, is the fate of every new therapeutic effort which is supposed to have a general application.

Thus, a long analytical and clinical article by Dr. Guttmacher terminates with the following conclusion :

“ Unfortunately, it would seem that the same lot awaits

(†) Ueber Sub-conjunctivaler Injectionen. (*Archiv f. Augenheilkunde* XXIX., p. 286.)

ent with sublimate which has followed other therapeutics the results of which have been published too conclusive experiments have been made. Great pain has been awakened, much pain has been occasioned, result has been obtained, and not a small number of eyes have been harmed."

This pessimistic author classes me among those in favor of a new method of treatment, I would recall that, at the discussion which took place two years ago, and the investigations made by the *Annales d'Oculistique* (vol. 1, p. 145), I have been, with my colleague, Masseran, an enthusiast for sub-conjunctival injections of

an antiseptic action as the result of the injection of a 1/1000 or 1/2000 solution of sublimate, only a very small portion of which reaches the eye and its cavity, is, in my opinion, to declare one's self a partisan of homoeopathy. In opposition to this, that experiments on animals after such injections it is possible to find the prescure in the cornea, and even in the aqueous humor, lead me to declare to me that this proves nothing from the standpoint of antiseptic action. Is any microbicidal effect whatever demonstrated by laboratory experiments with such weak solutions of sublimate that even the strength is no longer known, and delicate tests are necessary to reveal its presence?

In no way in favor of the doctrine of Hahnemann, on the other hand, I still remembered the perfect tolerance of my patients, whom, as a result of Raehlmann's detachment of the retina, I treated with sub-conjunctival injections of salt water in the dose of a half or an ounce-full, I returned to large injections and employed a 1/1000 solution of sublimate. The therapeutic result has been the same, as compared with that of weak injections, that their rapid efficiency has not been tenable, either for my pupils, who have carefully followed my instructions, or for those who have witnessed their surprising effects in a large number of patients.

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I have ordinarily injected half a Pravaz syringe-full, the following formula :

Sublimate	0.015 gr.
Salicylate of eserine.....	0.05 gr.
Sterilized distilled water.....	30. gramm

The myotic is only replaced by atropine or scopolamine if the case is complicated with iritis, and the combination of the sublimate solution with a myotic has seemed to me to produce a more favorable action than the simple sublimate solution.

The injections are first performed daily, during from one to three days after preparatory disinfection of the lashes with a 1% solution of oxycyanide of mercury and irrigation of the conjunctiva with a 4% boric acid solution. In antiseptic cases, bandage for the eye completes the treatment. The intervals for the injections and the amount of fluid injected are regulated according to the improvement. Even in very advanced cases of suppuration of the cornea with hypopyon, 6 or 8 injections are necessary to obtain recovery with clearing up of the diseased portions.

In glancing over Nagel's *Transactions* for the year 1893 I was struck with the almost identical conclusions of two of my Italian colleagues, Sgrosso and Scalenci, based on extensive clinical and experimental work : "*Sub-conjunctival injections,*" said my colleagues, "*are of the greatest (grandissima) utility in corneal ulcers, even the graver ones, but of slight or no utility in septic inflammatory diseases of the cornea and the other membranes of the eye.*"

This was so far in accord with my results that I did not endeavor immediately to inform myself whether a method similar to mine had been used at the Naples clinic, for the simple perusal of the *Transactions* gave me no information in this respect.

The reading of an original article published in the 1893 volume of the report of the Naples clinic (1) informed me that in the practice of de Vincentiis large injections of a half to three-quarters of a syringe-full are used, and "in grave

(1) Le iniezioni sotto congiuntivali ed intra tenonione di sublimato e di atropina. *Labori eseguiti nella Clinica Oculistica di Napoli*, Vol. III., 1893.

syringe-full is injected in two or three different points in the conjunctiva near the cornea, in order to avoid gangrenous ulceration of the conjunctival tissue from the great distention of the conjunctiva which has sometimes occurred."

For this purpose, a 1% solution was preferred, and in some cases, using the formulæ of Secondi, in which there is an addition of sodium chloride of sodium (1).

For exclusively solutions of 1% I have never seen more than a portion of the conjunctiva, severe pains, or œdema of the eye or the other lid, accidents described by my colleagues as "almost constant."

That, these injections have seemed to be scarcely sufficient for the eye was well cocaineized; they have an undoubted effect. Patients with large ulcerations of the cornea have had sleep, of which they had been deprived from the commencement of their disease, and almost all spoke of the improvement produced by the injections.

The noticeable difference between the method employed in my clinic and mine is that I have given 2 to 3 injections in a minimum in severe cases, while my colleagues state that in such cases a single injection was sufficient. It is indisputable that the number of injections of large doses is very small in comparison to the number required with small doses. Darier tells us (see *Annales d'Oculistique*, Vol. 1) that from 50 to 60 injections every two or three days is true, for ulcerative affections of the cornea in

terms of the original side of large injections, such as I have employed them, is that, with the exception of a few rare cases which I have combined them with curetting of the ne-

mate.....	0.05 grammes.
side of Sodium.....	0.10 "
led water.....	100. "
ilized bottle.)	

mate.....	0.05 "
side of sodium.....	0.10 "
led water.....	50. "
ilized bottle.)	

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crossed portions of the cornea, they have constituted the form of treatment used in destructive affections of the cornea frequently far advanced, and keratotomy, the actual cautery, paracentesis, etc., have never been employed.

But such has not been the case with those who have preceded me in this kind of treatment, as is clearly shown from the passage in an article which appeared last month by Dr. Mellinger (1). This colleague says expressly: "Secondi (2), as Reymond's assistant, was the first to recommend sub-conjunctival injections of sublimate in destructive processes of the cornea, used, besides, especially in keratitis with hypopyon, quite varied forms of treatment. Wherever injections of sublimate have been used for this class of affections of the cornea, the usual methods of treatment, consisting of the use of atropine, irrigations, bandaging, and moist heat, have been superseded. On this point compare the articles by Darier (3), Matarrugas (4), Gepner (5), Van Moll (6), Oetken (7). Sub-conjunctival injections," adds Dr. Mellinger, "should not and cannot ever represent the only method of treatment in destructive processes."

On the other hand, in my practice, occlusion of the eye with large sub-conjunctival injections have been the *only method* of treatment employed in a large majority of destructive affections of the cornea, and therefore to them alone can the curative power be attributed.

It is of slight importance whether this is due to antiseptic action or to acceleration of the lymph current in the cornea, or, finally, to the circulatory modifications which occur, all influences of a quantitative action it will never be possible to verify.

(1) Zur Frage der Wirkung sub-conjunctivaler injectionen. (*Klin. Monatshefte*, April, 1895.)

(2) Le iniezioni sotto congiuntivali di sublimato corrosivo, etc. Pavia, 1890.

(3) *Archives d'Ophtalm.*, 1891.

(4) *Paris Thesis*, 1894.

(5) *Centralblatt f. Augenheilkunde*, Jan., 1894.

(6) *Klin. Monatsbl.*, 1892, p. 329.

(7) *Kiel Thesis*.

ON HEREDITARY NYSTAGMUS

By Dr. **H. AUDEOUD,**

Physician to the Polyclinic of the University of Geneva.

Observed at the Children's Hospital a young girl with
dating from early infancy, and have found several
lar cases in her family. As this is not of frequent
, I thought it would be interesting to give a detailed
of the case. My thanks are due to Dr. Martin,
even me every facility in making my observations.

ent was a child ten years of age, treated at birth, as the
, for an ophthalmia. She could have had no previous dis-
had had trembling of the head from early infancy, for
was brought to the Children's Hospital on July 13, 1894.
intelligent, wide-awake child, and could sew and read
ere were horizontal arhythmic oscillations of the head,
ed during sleep and were diminished by exertion of
This was rather a movement of rotation than a properly
abling. This condition frequently accompanies nystag-
uch was the case here; there was, in fact, very marked
nystagmus in both eyes. Vision, which was diminished,
h eyes $\frac{1}{2}$ of the normal. The pupils were equal, and
fectly. The motility of the eyeballs was normal, except
stagnus. There was no hemianopsia. Ophthalmalmo-
ination, made by Dr. Sulzer, showed that the transparent
intact, but there was a partial atrophy of both papillæ,
ed in the right than in the left eye, secondary to an old
tis.

ne extremities, there were slight shaking movements in
and feet. Sensation and the reflexes were normal, as well
The respiratory, digestive, and circulatory systems, and
were normal. As treatment. antipyrine in doses of 0.25
daily, combined with cold douches, was first tried; then
of potassium 0.50 to 2.50 gr.; finally, sulphate of atropine
gramme, without obtaining any result, as might have been

at interesting fact in connection with this patient was her
antecedents. It was, in fact, found that there had been
aily, *on the maternal side*, no less than six other cases of

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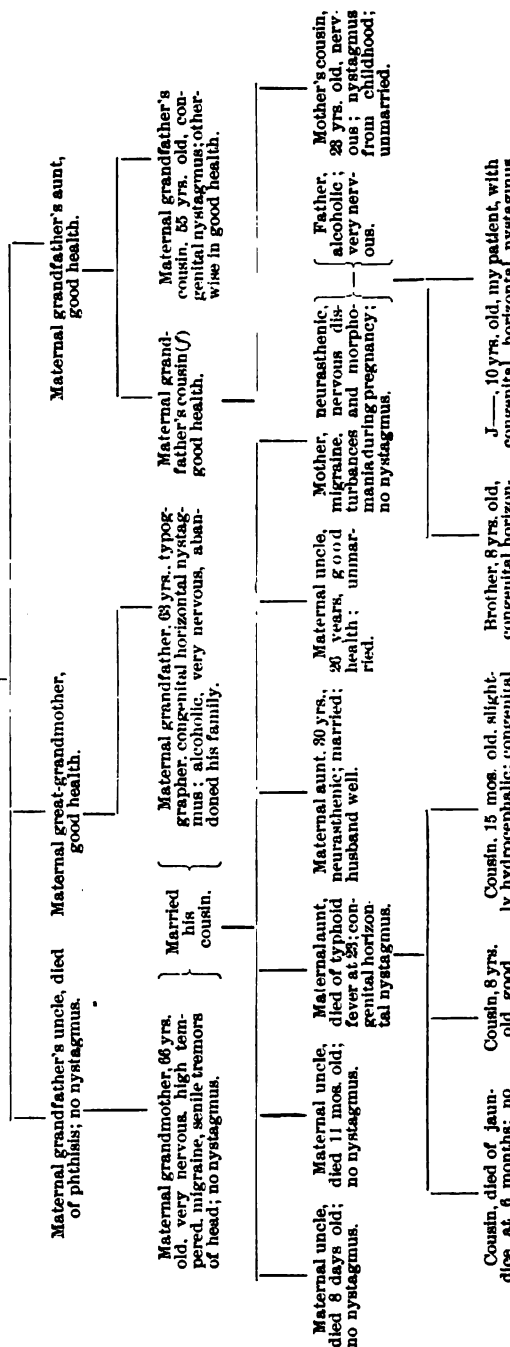
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GENEALOGICAL TABLE.

Showing 7 cases of nystagmus in three generations of one family.

Maternal great-great-grandfather, unknown.



which dated almost from birth and had lasted through these persons it was also found that there had been a tremor of the head which had lasted for a longer or shorter period, as in the case of the father. The six relatives thus affected were the following : a son eight years old, a cousin eighteen months old, an aunt twenty-three years of age, the grandfather, sixty-three years of age, a cousin of the latter, and a cousin of the mother—all, *on the maternal line.*

The family should also present nervous stigmata, and such was the case. The cousin who was affected with nystagmus had a pharyngeal diverticulum. The mother and an aunt were neurasthenic. The father, who had married his own cousin, was an alcoholic, and who had abandoned his family. The grandmother was epileptic, and suffered from migraine. Two cousins of the mother were epileptic.

On turning to the paternal hereditary line of this patient, we find the father is high-tempered, alcoholic, and brutal; an uncle was an alcoholic; the grandfather was insane and committed suicide; three great-uncles, one had been insane, another had been a murderer, and the third is extremely peculiar; the great-grandfather was an alcoholic and insane; finally, a cousin had intellectual deficiency. This, then, is an heredity sufficiently charged with disease.

Considering this nystagmus, which was common to seven members of this family, the question arises as to what was its cause. In my patient it was evidently not symptomatic of rheumatism, hemorrhage or softening, of tubercular degeneration, of a tumor or multiple sclerosis. Nor did the cause appear to be muscular, as in miners' nystagmus. Finally, it had nothing to do with defective development of the eyeballs, nor with opacity of the cornea, the lens, or the vitreous body. Did it depend upon a disease of the iris or the ciliary muscles? All these causes being eliminated, there remains the possibility of a neuritis, traces of which could still be seen. This does not give a sufficient explanation, since so many cases of nystagmus have no nystagmus. But, considering the strong predisposition, is it not possible to think that a neuritis, perhaps at birth or shortly after, had been the determining cause of the nystagmus in this child?

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Let us consider the other members of the family.

1st. E——, *her brother*, eight years old, had been troubled with horizontal nystagmus and trembling of the head since the age of three months, according to the mother's statement. The latter was increased by joy or emotion. This child had whooping-cough at the age of three years, measles at three and a half years, and pneumonia at six years, and these diseases had had no influence on the anterior disease. He is now a horizontal nystagmus similar to that of his sister. There is no ocular paralysis; the pupils are equal and react normally. Vision is $\frac{1}{2}$ in the left eye and $\frac{1}{3}$ in the right, but there is neither hemianopsia nor dyschromatopsia. The transverse media are intact, and *the fundus is normal*. This child has never been troubled with his eyes, and is otherwise in good health.

2d. J——, eighteen months old, was *her cousin*. He has always been weak and sickly. When he was three months old those about him had noticed that he was affected with nystagmus, and at this time there was also a trembling of the head, which soon disappeared. Now, as far as can be judged at that age, is good. The horizontal nystagmus is slight. *The fundus in both eyes is normal*.

3d. A——, twenty-three years old, was a distant cousin of my patient, since he was only the *son of her grandfather's cousin*. His sight had been bad from childhood, but it was not till he was between eight and nine years old that his grandfather noticed that he had nystagmus. Trembling of the head appeared at the same time. This young man had been recruited for military service on account of this infirmity, although he was not a bad shot. He enjoyed good health, and was a enthusiastic and expert bicycle rider. Examination showed that he had a high degree of horizontal nystagmus and a trembling of the head. He had no voluntary influence over the latter. His head shook when he worked, and when his sight was fixed on an object. Vision was $\frac{1}{4}$ in the left eye and $\frac{1}{3}$ to $\frac{1}{4}$ in the right; he was emmetropic; had no astigmatism; color vision was normal; fusion of images and stereoscopic vision persisted in spite of the nystagmus, a fact which is unusual. Movements of the eyes were easily performed.

Pupil reactions were normal. The transparent intact. *The fundus of both eyes was normal.* Normal was found in the circulatory, respiratory, systems. The urine was normal.

—, fifty-five years old, was the *cousin* of my *grandfather*. He told me that his nystagmus dated but that his sight and his general health had always nt. Although he had been rejected for military as an amateur shot. His nystagmus was slightly had been greater in his youth, when it was ac- with trembling of the head like that in the other he family, but this trembling has now almost en- eared. In 1891 he came to Prof. Haltenhoff's ere a decided astigmatism was found in both eyes. ion is now very slight, without manifest hyper- His presbyopia = 3 D. Vision in both eyes is $\frac{5}{18}$ ection and $\frac{1}{2}$ with correction. The nystagmus, iceable, is increased to the maximum when the to the left.

Examination, made on February 20, 1895, by Dr. ed the following: horizontal nystagmus; when fixed his sight on an object placed before him, horizontal movements were noticed, interrupted os just in the position of fixation. The motility was normal. In the extreme lateral positions the f nystagmus became larger and more rapid. The is a hunter, has noticed that he aims more easily a downward. The periods of cessation of the re, in fact, more readily produced when the patient. ward. Vision is $\frac{5}{60}$ in the left eye and from $\frac{5}{30}$ to ght. It is $\frac{5}{18}$ in both eyes after the correction of m of 1 D. On ophthalmoscopic examination the ar slightly gray, but of normal aspect, considering e patient. The visual fields and color perception An interesting fact is that the patient complains e outlines of the letters of Snellen's test types.

maternal grandfather also had nystagmus, but he is family, and no one knows what became of him.

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As for the *maternal aunt*, she also had nystagmus, several years ago, of typhoid fever.

Thus, in short, in 5 cases of nystagmus the fundus of the eye was found to be normal in 3 cases, in 1 a partial atrophy of both papillæ was found, and in 1 the papillæ were almost normal; in 3 cases the vision was below normal, without any connection from any ocular lesion.

What conclusion can be reached, except that the nervous system played an important part? But what exactly was the part? Of this I am now ignorant, but one may compare nystagmus with similar or similar nervous affections, as in this case, as occurring from some hereditary localized sclerosis in some part of the brain.

In this connection the following lines may be quoted from an article by Legrand du Saulle on "Hereditary Nystagmus" (1873, p. 81): "Nystagmus does not appear as frequently in persons with mental affections as in their descendants. It is not rare to see very intelligent persons with nystagmus, the parents of whose antecedents were neurotic or insane, without themselves being thus affected themselves. Nystagmus is a mark of pathologic hereditary. It is a defect which rarely exists isolated, and is always found in connection with many other physical signs (as, for example, hereditary facial tics, etc.). Evidently it cannot be said that a person with nystagmus is destined to lose his reason. One can simply say that nystagmus is one of the signs of cerebral pathology, and that this peculiar condition is almost always met with in those who are descended from families which are affected from the mental point of view."

I have found very little in literature in relation to hereditary nystagmus. Doumic (1) mentions the case of a brother and sister, both of whom were albinos. Nettleship (2) describes monocular nystagmus in three brothers in whom the same eye was affected in all. Owen (3) and Wood (4) also report cases, but I have been unable to find a case similar to that which I have described.

(1) *Union méd. de Paris*, 1858, p. 439, and *Bull. Soc. chirurg.*, 1858-59.

(2) *Ophth. Hosp. Rep.*, London, 1886, Vol. XI., p. 75.

(3) *Picture of Hereditary Nystagmus*. (*Ophth. Rev.*, London, 1881-82.)

(4) *Picture of Hereditary Nystagmus*. (*N. Am. Practitioner*, Chicago, IV., p. 179.)

CLINICAL NOTES

IC PARALYSIS OF THE EXTERNAL REC- USCLE FROM A CONTUSION OF THE OID PROCESS OF THE SAME SIDE

By Dr. **H. ARMAIGNAC.**

of the muscles of the eye, either exterior or inte-
result of a traumatism, are not rare, but they may
a various circumstances. Thus, a distinction may
between the cases in which the muscle itself is injured
matism, those in which it is affected only indirectly
e-coup, and those, finally, in which the lesion
course of the nerve which supplies the muscle.

t category may be classed direct contusions or in-
eyeball or of the walls of the orbit. In the second
contusions of various kinds which do not affect the
tly, but only the neighboring parts. For example,
the ciliary muscle is frequently observed as the
blow, at times very slight, on the anterior portion
from a projecting branch of a tree, the cork of a
or sparkling water bottle, etc.

a the third category, the lesion does not affect the
only the nerve which supplies it, and in this case
ture or tearing of the nerve is found, as in the
ture of the petrous portion of the temporal bone,
the orbital foramen, or the sphenoidal fissure re-
a fall on the head, an injury from a fire-arm pro-
In still other cases the nerve trunk is not injured,
tly compromised by a hemorrhage which occurs
sheath or in its vicinity.

es the traumatism must be sufficiently severe, and
one or of several ocular muscles is frequently the
m which leads to a diagnosis of internal lesions.

muscles of the eye, either in groups or singly, may
alyzed, but the external rectus seems to be most

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frequently affected from injuries of the base of the skull Panas has observed. The reason for this is simply ana-

In fact, while in its first portion, extending from the globe where it emerges to the posterior surface of the petrous portion of the temporal bone where it traverses the dura mater, the external oculo-motor nerve is distant from the bone from which it is separated by the arachnoid and the pia mater. In its second portion, on the other hand, it forms a deep loop with antero-external concavity which surrounds the petrous portion of the temporal bone and closely embraces its superior angle near the apex.

Nothing separates the nerve trunk from the bone except the petriosteum and, quite below, the inferior petrosal sinus. Throughout, the dura mater closes, and fixes the nerve to the temporal bone. It is not surprising, then, that the nerve is almost always involved in fractures of this bone when such is known, most frequently affect its apex, and, in particular, its edge.

Can not paralysis of the external rectus muscle occur as an important lesion of the petrous portion of the temporal bone? Up to the present time the various cases published by writers would seem to lead to this belief, but the case which I now describe will show, I hope, that this is not always so.

The case was that of a lad, fifteen years old, who, while running, fell so that the external surface of his left orbit and process was thrown against the edge of a comrade's tile.

Scarcely had he got up when his companions noticed that he squinted inward with the left eye. The boy himself experienced only a fairly marked diplopia, which increased when he looked to the left, and a slight headache, which disappeared during the following night.

The boy was brought to me the day after the accident. His general condition was perfect; the headache of the day before had disappeared, and there was only slight pain in the upper part of the orbit, but there was a convergent strabismus of the left eye with absolute impossibility of moving the eye o-

muscles of the eye functionated normally. Vision, and near points, was perfect on correcting a slight myopia, equal in the affected eye to 0.75 D. The eye was even greater than in the right, in which, there was double the amount of myopia. The only disturbance of which the boy complained was the diplopia, quite troublesome at far points, but less decided in

Furthermore, objects appeared slightly yellow to the left eye. There was nothing abnormal in the auditus, and no trouble in hearing, and there had been, of the accident, no hemorrhages from the ear, or disturbances, such as vertigo or vomiting.

A careful ophthalmoscopic examination revealed nothing abnormal in the fundus of the eye.

Fusion of the mastoid process must have been quite perfect, there was a large scab which had resulted from the skin.

In the absence of severe general symptoms, the paralysis of the external rectus indicated that some serious disturbance had occurred somewhere in the course of the nerve, and I thought it prudent to prescribe absolute rest, diet, and fresh air.

A few days the general condition still remained perfect, the paralysis did not diminish, and so I tried faradic electrical times over the paralyzed muscle.

The patient bore them very well, and as the eye commenced to move a little outward, I continued the application of faradism to the external rectus three or four times a week. As a result of this treatment, which I have continued to the present time to the exclusion of everything else, the boy recovers in fifteen days, and the paralysis has practically disappeared. Now the mobility of the left eye outward is to be as extensive as that of the right eye, but there is still some disturbance in the function of the external rectus muscle, for there is homonymous diplopia at a distance corresponding to a strabismus of 5 or 6 degrees in extension. In fact, fusion of images is obtained

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placing before this eye a prism of 10 or 12 degrees with base out.

On intentionally interrupting the electrical treatment five or six days, I noticed that during this time the pupil remained stationary. As soon as I again applied electricity to the muscle the improvement resumed its regular progress and complete recovery will soon be obtained.

From the technical standpoint, it will be recognized that the application of electricity to the muscles of the eyes is a very little used. As a rule, a large, moist electrode is applied to the closed lids, and the current most frequently used is continuous current, with an intensity of 4 or 5 milliamperes.

I have often used electricity in paralysis of the ocular muscles, but the only current which has given me really successful results is the faradic current, obtained with a small induction coil.

I have sometimes used a bi-polar electrode obtained by joining two isolated metallic wires on one handle, which is terminated at one extremity by a little ball which is enveloped with moist cotton, and the other extremity of which is connected with one of the rheophores. More frequently, however, was so in the case which I have described, I have employed a small uni-polar electrode. It is, like the other, a metal wire with enlarged extremity, a simple pin, the head of which is enveloped in cotton and moistened when it is to be used. I apply it directly to the bulbar conjunctiva of the paralyzed muscle after instilling two or three drops of a solution of cocaine between the lids. The other electrode, of a large surface, is held in the hand by the patient or applied to any part of the body. I pass the current during five or ten minutes, and graduate the intensity by means of a rheostat so that it is easily borne by the patient.

And now, to return to the case which I have described, which occurred in the course of the sixth nerve at the time of a violent blow on the mastoid process? Was there simply a disturbance of the nerve, or was there a hemorrhage, and at what point?

certainly not in the vicinity of the sphenoidal fissure
 anterior pole of the eye, for in that case other nerves
 which would have been involved, and vision would have
 been affected. The hemorrhage would have exercised the same
 effect on the other nerves, and on the optic nerve, which
 was paralyzed.

I think it possible that the hemorrhage occurred in the
 cranial portion of the nerve, as in that case general
 paralysis would have been observed more severe than the
 partial paralysis from which the lad suffered for a few hours.

Tracing this portion and the anterior portion beyond the
 sphenoidal fissure there remains only the median portion of
 the nerve trunk entirely included within the cavernous sinus.
 The portion that the nerve is in most intimate relation
 to the cavernous portion of the temporal bone, the superior
 part of which it surrounds near the apex, being only separated
 from the bone by the periosteum. If there was a hemorrhage
 here, I think, that it should be localized, for it is
 contained in the nerve sheath without producing any other
 than a temporary paralysis of the nerve.

Lesions of the base of the skull, accompanied so often,
 with paralysis of the external rectus, it is generally
 in the region where the sixth nerve passes that the sphenoidal
 fissure fracture occurs. In the case described there was
 a fracture, and the hypothesis of a small hemorrhage
 seems to me to be the only possible theory, unless it is
 considered that the disturbance of the nerve by the fracture
 was sufficient to bring on the paralysis without any
 lesion of continuity or contiguity. In any case,
 the case is the less curious, for the traumatism, it must
 be, only of relative violence.

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II.—REPORTS OF SOCIETIES

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of June 4.

Ocular Diphtheria and Sero-therapeutics.

DR. A. TERSON.—It is now known that diphtheritic conjunctivitis in both severe and benign forms, has for its cause the bacillus of Loeffler and its associates. Although it would be useless to compare the presence or absence of the bacillus of Loeffler as a cause of benign or malignity, yet bacteriological examination is necessary to determine the microbial associates—the association with the streptococcus seeming to be the more grave—to prove the presence of the bacillus of Loeffler, and in such case to institute general diphtheritic prophylactic treatment, and, finally, to study the virulence of the microbes involved, as the bacillus may be absolutely neutral or pseudo-diphtheritic form.

On the question of bacteriological diagnosis Dr. Morax (April number, p. 238), reports some interesting cases communicated to him. 1st. A child six years old with benign pseudo-membranous conjunctivitis, in whom the bacillus of Loeffler was found in pure virulent form; rapid recovery from diphtheritic conjunctivitis and tonsillitis after several injections of Roux' serum. 2d. A child several months old, with pseudo-membranous conjunctivitis, in whom were found virulent bacilli in association with the streptococcus staphylococcus aureus; recovery after a single injection of Roux' serum (10 c. c.).

Morax also reports two rare cases: one, a case of pseudo-membranous conjunctivitis with the bacillus of Weeks and the diphtheritic bacillus; the other, a case of pseudo-membranous conjunctivitis of very severe type (von Græfe) containing pure streptococcus. This last case shows that the name of diphtheria should not be continued for severe forms of conjunctivitis with false membrane, since they may be produced by other microbes without association with the diphtheria bacillus.

Morax thus makes his contribution to sero-therapeutics in diphtheria with his two very favorable cases. There are no other cases which have been thus treated, all of which have given good

Desseaux, Morax, and Jessop). The sero-therapeutic then be fulfilled in such cases by following the last in- Roux. The local treatment, irrigations of the culs-de-lutted Labarraque's solution, etc.), is applicable to the robes, but seems to be useless in cases where the bacillus is in state. Sero-therapeutics seems also to be of value in its specific action, and a preventive injection may be given to every person with pseudo-membranous conjunctivitis, and to those persons about him. It has not yet been shown to have any action on the other accidents of diphtheritic origin, such as paralysis.

Report on the Study of Lesions of the Papilla and the Optic Nerve in Cerebral Tumors.

KAUD.—(This report on the work of Dr. Rochon-Duval has been published in full.)

ELLI.—I should like to call to Dr. Parinaud's attention the work of Prof. Scimemi. He has performed experiments on the effect of pressure, and his results corroborate those of Dr.

Y.—Cerebral tumors may cause a great variety of lesions: atrophy of the disc, simple atrophy, neuritis with œdema limited to the disc, or extending to the neighboring parts of the retina. Rochon-Duvigneaud studied the different clinical aspects of these lesions.

E.—The causes of the neuritis which accompanies cerebral tumors are probably multiple, and the infection theory of Parinaud and Leber, which seems to me to be one of the best, cannot be ignored. If we look at the facts as they are, and in practice it will be seen that trepanation may cure the neuritis, and I consider this rather an argument in favor of the infection theory; the action of the trepanation may be likened to laparotomy in tubercular peritonitis.

E.—I think that the infection theory cannot be abandoned, and that the therapeutics of the future will be directed against infection. PARINAUD.—Dr. Parinaud's report is very interesting, and I think that he does, that Deutschmann's ideas are false and dangerous. He cannot explain everything, and we know, for example, that the infection which sometimes accompanies tubercular meningitis is not completely cured. It is hardly probable, therefore, that this is a local lesion. The study of the lymphatic canals of the head is of great importance, and by this means we will reach the solution of this question.

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Dr. Parinaud.—I would reply to Dr. Abadie that I do not think the theoretical side is to be abandoned, for in the diagnosis of cerebral disease neurologists frequently ask us the significance of neuritis, and if the mechanical or infection theory is followed the same course will surely be taken. Edematous neuritis has very characteristic characteristics; that which we have been studying is always differentiated by the fact that it is bilateral, from the absence of accord between the lesions, which are frequently enormous, and from a visual disturbance, which may be scarcely noticeable; vision is preserved for years in spite of large ophthalmoscopic lesions. In cerebral lesions of the base evidently different forms of neuritis may be observed. The neuritis of meningitis and that of cerebral tumor are not identical, although at first several slight differences may be noted.

Syphilis of the Lid Cured by Treatment with Iodide of Potassium Alone, and Followed by Cerebral Compressions Which Resisted Treatment with Iodide and Mercurial Inunctions but Were Cured by Hypodermic Injections of Cyanide of Mercury.

DR. ABADIE.—This detailed case, due to Dr. Dubarry (Paris), relates to a patient whose initial syphilitic lesion had passed unperceived. In his past history it was simply found that he had contracted tonsillitis during his military service in 1870: perhaps this was a chancre of the tonsil. He had had no secondary lesions, and had not been subjected to specific treatment. He was married, and his wife had had sixteen pregnancies all terminated at term; many of the children had died in early infancy, a fact which was in favor of a diagnosis of syphilis. Twenty-two years after the supposition of the initial lesion he was attacked with an ulceration of severe and progressive form on the lower lid of the right eye. At the same time he was seized with epileptiform attacks followed by coma, from which he recovered, with a certain amount of physical and mental lassitude.

He had undergone no treatment, and when Dr. Dubarry saw him for the first time the ulceration had destroyed the greater part of the lower lid and had attacked the upper. The general health was good. At first 6 and afterwards 8 grammes of iodide of potassium was prescribed daily. After four days there was already a considerable improvement, and in fifteen days the ulceration was completely healed. In spite of the healing, the treatment with iodide was continued, and he was also subjected to mercurial inunctions. Six months afterwards cerebral disturbances again appeared: emutation of speech, returning epileptiform seizures, paresis of the

âtisme, and then intellectual disturbances. The patient
ated with sub-cutaneous injections of cyanide of mer-
cution. After the fifth injection the improvement was
fest, and in five months the cure was perfect.

more case in support of the superiority of sub-cutane-
of mercury.

Membranous Conjunctivitis with Pure Strepto- ; Ill Success of Anti-diphtheritic Serum.

R.—New-born child with ophthalmia on the fifth day.

with 2% nitrate of silver and irrigation with perman-
tash. Two days after, false membranes appeared. Dr.
ibed, in addition to the above treatment, cauterization
ice every three hours.

on of membranes: Pure streptococci; injection of 6, 7,
c. of Roux' serum. Improvement the first two days,
aggravation and total loss of both corneæ.

nature of the infective agent which caused the exces-
y of this case?

present time cases of diphtheritic conjunctivitis have all
y the serum treatment, but no case has been described
streptococcus alone was the cause.

at in the prognosis of ocular diphtheria, even when
serum, one should take into consideration: 1st, very
ts (the new-born); 2d, the precocity and extent of the
ns; 3d, participation of the bulbar conjunctiva in the
process; 4th, the predominance or exclusive power of
ocus, in which case it would be proper to try anti-strep-
n, which is not easily found.

son.—I should like to communicate to you, in the name
ue Sourdille, the following case of non-diphtheritic false
reated with serum. A girl, twenty-six months old, was
e Hotel Dieu about the middle of the month of May.
both eyes were swollen, indurated, and discolored; the
conjunctiva was covered with a grayish adherent false
which was not removed by friction. Before any bacterio-
nation was made 10 c. c. of Roux' serum was injected.
on plate cultures revealed the presence of gonococci in
nce. The cultures were negative from the diphtheritic
, and only colonies of white staphylococci developed.
membranes disappeared in about sixteen hours, but the
became distinctly purulent and continued its develop-

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ment. One cornea was perforated, and it was with great difficulty that perforation of the other was avoided, in spite of the use of nitrate of silver and permanganate of potash. The injection of serum does not seem to have had a beneficial influence.

Dr. Abadie.—In the case reported by Dr. Darier the prognosis of the disease was most unfortunate, and the question arises whether the injection of serum could have been harmful. We know, however, that the association of toxine produces far more serious effects than ten years I have always employed lemon juice in diphtheritic conjunctivitis, and I have never seen a case develop in so grave a form as that described by Dr. Darier. Bacteriology does not decide everything, and I think it a mistake to renounce the use of lemon juice.

Dr. Galezowski.—I have lately seen a child with ophthalmia which was treated with injections of sublimate, then with injections of serum, then with irrigations of permanganate of potash, and finally was brought to me with advanced corneal lesions. This was not an ophthalmia of the new-born, aggravated by treatment, but the influence of canterization with nitrate of silver twice had been marked improvement has already resulted. Diphtheritic conjunctivitis is very rare, and in ophthalmia of the new-born, which is always identical, diphtheria should not be considered when there are false membranes. It would be proper to request the public authorities to forbid midwives to treat ophthalmia of the new-born. The necessity would then be very much diminished.

Dr. A. Terson.—It is quite certain, as I have stated in my report, that the presence or absence of the bacillus of Loeffler does not indicate either the benignity or malignity of the disease. It is independent of its usefulness from the pathological standpoint. Bacteriological examination is very useful to determine whether the disease is really diphtheritic, a fact of great importance in prognosis, and to determine whether serum treatment should be employed, and what serum.

As for the pretended aggravating action of the injection of serum in a non-diphtheritic case, it cannot be deduced from a single unfavorable case, and if the efficacy of serum treatment is not completely established, its dangers are less so.

Dr. Abadie.—I have lately treated a child with a peculiar conjunctivitis with slight infiltration of the centre of the cornea. This child had had a diphtheritic tonsillitis, which was successfully treated with serum, and the conjunctivitis developed ten days after the recovery from the pharyngeal disease.

es.—Serum injections and toxine injections should not be given to each other, as Dr. Abadie has done; they are two essential things.

r.—Purulent ophthalmia of the new-born is frequently complicated by diphtheritic conjunctivitis, because there may be false membrane.

I am convinced of the efficacy of nitrate of silver, and have been tested against the use of Kalt's treatment. In the case described it could not be said that the injections of serum retarded the progress of the disease, for in another case, in which false membranes developed as the result of too severe cauterization, no diphtheritic bacilli were found, injection of serum had no influence.

PHYSIOLOGICAL SOCIETY OF BERLIN

July 20, 1894.

Human Visual Purple and Its Role in Vision.

W. NIG and ELSE KOETTGEN.—The study of visual phenomena has been pursued by two different methods: the one objective, the other subjective. The anatomical and physiological modifications caused by light on the retina are observed. Boll and Kuhne have followed this method and have made a special study of the visual purple. The other method, the subjective method, studies the sensations and the modifications by color comparison or other processes. These two methods have led to the discovery of certain facts, but the results have not been brought into one another.

By experimenting under new conditions, has endeavored to bring into connection between these facts, and his researches have been especially to the physiological analysis of achromatopsic eyes. He has established the coefficients of absorption of human visual purple. He found that the coefficients of absorption were identical, whether in normal distribution, with the value of stimulation of the different chromatic lights for the limit of stimulation and for the limit of light in total achromatopsia. There can be no doubt, that the sensation "gray" is caused by the transformation of the visual purple, and that in total achromatopsia the visual purple is a purely photo-sensitive substance. The first objection which has been made is that for weak intensities (or in achromatopsia for low intensities) the fovea should be blind, since it contains

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Koenig has found : 1st, that with weak intensities (coming to the point where the colors of light disappear) the blind ; 2d, that achromatopsic eyes are blind for all intensities in the fovea.

The transformation of purple produces visual yellow. The coefficients of absorption of visual yellow correspond to the distribution of the sensation "blue." As there is no purple in the fovea, there should be no visual yellow there, and, consequently, the sensation blue would not exist. Koenig has found complete darkness for blue in the fovea. The following experiment may be performed : look at the moon through a blue glass ; if fixation is sustained the moon will be no longer seen in the zone of fixation.

According to Koenig, the sensation which for weak intensities responds to gray is not quantitatively different from the sensation which for stronger luminous intensities corresponds to blue. The difference is only a physiological difference between them.

From all this, the photo-chemical substance for the fundus sensation "blue" of the Young-Helmholtz theory must be found in the visual purple and in the products of decomposition.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Annali di Ottalmologia

Reviewed by Dr. PARISOTTI.

XXII. YEAR, No. 6.

I.—**Criticism and New Interpretation of Hense's Experimental Phenomenon**, by Dr. BAQUIS.

This is an article in which the diagrams and formulæ are of more importance than the rest, and which, therefore, cannot be reviewed in a few words. It will be consulted with advantage by those who are interested in the subject of physiological optics. I will not give the conclusions reached by Dr. Baquis.

When a luminous source is placed before the eye and is not fully fixed by the eye, three images may be seen instead of one :

1st. An erect image which is projected in the same region as the flame is found.

2d. An inverted image slightly enlarged, with very distinct color, which is displaced slowly in the opposite direction to the flame, which makes excursions similar to those executed by the flame.

3d. An erect image very much enlarged, with indistinct color, which is displaced rapidly in the same direction as the flame.

ns of which become more and more rapid on going from
to the periphery.

Micro-organisms of the Normal Conjunctiva,

by Dr. E. GASPARRINI.

ERANI has made a bacteriological study of the conjunc-
e than a hundred healthy eyes of persons in very differ-
ns of life, from those in hospitals to those in the country.
ade cultures on agar-agar and in beef-tea. The products
ated under the skin of rabbits, and sometimes the entire
l secretion was injected under the skin. The search for
rganisms was made in the blood, either when the animal
r when it simply showed morbid symptoms. The author
at the diplococcus of Fraenkel is far more frequent than
coccus and the streptococcus.

coccus of Fraenkel.....	8 times in	10
lococcus pyogenes aureus.....	6 times in	10
lococcus pyogenes albus.....	5 times in	10
cocci.....	15 times in	100

On Dacryoadenitis of the Inferior Lobules of the Accessory Gland, by Dr. A. ANTONELLI.

or describes a case of this rare disease, and freely dis-
agnosis.

e the symptoms which Dr. Antonelli describes as belong-
fection. A small epibulbar tumor in the supero-external
hich extends under the bulbar conjunctiva to a short dis-
the corneal border and reaches below to the external
mmis sure without passing it. The tumor has not a very
n, as the lower lobes are not contained in the capsule.
the tumor is that of a small pea, almost round in form,
e surface, and of hard, elastic, or molasses consistency.
follows forced movements of the lid upward. Movements
all are not interfered with, and do not displace it.
ss or swelling of the lid. Slight conjunctival chemosis
the superior external quadrant. The tumor descends
e external rectus.

FROM THE OFFICIAL BULLETIN OF THE SOCIETY OF
OPHTHALMOLOGY.

(*Congress of Palermo.*)

Conjunctival and Sub-tendon Injections of Corrosive Sublimate, by Drs. SGROSSO and SCALINI.

ulae used were the following, given for the first time by

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Corrosive sublimate.....	5	gramme
Chloride of sodium.....	10	"
Sterilized distilled water.....	100	"
Corrosive sublimate.....	5	gramme
Chloride of sodium.....	10	"
Sterilized distilled water.....	50	"

Corneal Ulcers.—Recovery obtained with a single injection in 2 cases, with 2 injections in 8 cases; in 4 very severe cases with 3 injections. The quantity injected was from a half to three-quarters of a syringe-full distributed in two or three regions. In some of the most severe cases an entire syringe-full was used.

Syphilitic Affections of the Eye; Sympathetic Ophthalmia.—Against these diseases injections of sublimate have proved to be of great value as a means of prevention and treatment.

The truly surprising results obtained in ulcers of the cornea led the authors to investigate the manner in which the sublimate injected under the conjunctiva reaches the cornea. From experiments which are described in the article, they are of the opinion that the sublimate reaches the cornea, the aqueous humor, etc., through the lymphatic canals. The best substance which they have employed to detect the presence of sublimate is chloride of tin.

On the Structure of Capsular Cataract, by Dr. ADDARIO.

From the results of the examination of two capsular cataracts, the author thinks that the substance which produces the cataract is formed between the lamellæ of the capsule. In fact, a posterior lamella was found, covered on the posterior external surface with posterior epithelium, which is lacking on the anterior surface. The interior of the capsule contains an amorphous fibrous substance which is, according to the author, necrosed lens substance. Scattered through this substance are fusiform elements with one or more nuclei which, according to Dr. Addario, are of epithelial nature, and are destined to regenerate the necrosed fibres of the lens.

Lesions of the Optic Foramen in Fracture of the Base of the Skull, by Dr. AGEÏLLA.

Fractures were produced on the skulls of cadavers. Only those fractures of the base of the skull which were linear and not comminuted were considered.

The results of the experiments may be thus summed up: in fractures of the posterior and middle region of the base of the skull the optic foramen is rarely involved.

of the anterior region involve the optic foramen in
rds of the cases. Ordinarily the lesion is of the optic
the same side; rarely, the other also is involved. In
e is a doubling of the fracture in the neighborhood of
n plate in exceptional cases; rarely, the optic foramen
te side is injured, the fracture in this case crossing the
late without affecting the optic foramen on the same
irection of these fractures is almost the same in all
e fractures of the posterior and middle regions, and
l of those in the anterior region, may involve the spher-

ervations make at Professor Angelucci's clinic, the
een able to show that almost all fractures at the base of
followed sooner or later by lesions of the optic nerve.
s the monolateral amaurosis affects the eye on the same
ely the eye of the opposite side, and exceptionally, when
of the base is lateral, both eyes have been attacked.
be tearing or laceration of the optic nerve from the
also displacement of the anterior clinoid process.

Genital Hydrophthalmia, by Dr. ANGELUCCI.

at was a child six years old, with tachycardia, frequent
of the heart pulsations, and congenital hydrophthalmia

t disturbances have been observed by the author in all
congenital hydrophthalmia, with sometimes also val-
ency and dilatation of the left heart, arterial hyperten-
jective and objective sensations of heat on the head and
ese cases the character is always emotional and high-
These facts lead the author to think that hydrophthal-
sult of vaso-motor disturbances, and still more so, as
rbances are observed in such eyes.

**Stigmatism After Cataract Operation in Rela-
e Method of Operation and the Complications
After Extraction**, by Dr. BAIARDI.

ction without iridectomy produces the highest degrees
m.

nechiæ and prolapse of the iris are the reasons for the
n the flap method without iridectomy. Sometimes an
is seen after operation which is inverse to that which
others.

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A New Method of Tattooing the Cornea, by Dr. BAI

A dissection needle is thrust into the cornea in the peripheral portion to be tattooed. The point is pushed forward between the lamellæ of the cornea with pendulum movement, in order to make an interstitial space in the membrane. The needle is then drawn out, and through the same opening Chinese ink is introduced into the excavated portion with a small syringe.

Ocular Lesions in Diseases of the Liver, with a Contribution to the Study of the Nutrition of the Eyeball and Sparkling Bodies, by Dr. MOAURO.

Xantopsia results from infiltration of the biliary pigment into the refractive media and the retina. The rarity of this phenomenon is explained by the inconstancy of the filtration of the biliary pigment into the interior of the eye, as is shown by experiment.

Hemeralopia does not depend upon jaundice; it is rather, as Parinaud has said, a weakening of the luminous sense from the presence of the visual purple.

Secretion of the purple is altered by alterations in the blood, proved by tyrosine and cholesterine, which are found in the tears and of the eyeball.

Elephantiasis of the Lids; Lymphangioma of the Palpebral Conjunctiva, by Dr. E. POLIGNANI.

The author has seen two kinds of elephantiasis of the lids. The first variety was soft and telangiectasic. The second was a nodular lymphangioma of the palpebral conjunctiva in a tracheobronchitic patient. In both cases the author has been able to find "forming" nodules, which have as yet only been studied by E. and which are the origin of new lymphatic canals in continuity with pre-existing canals. He thinks that with this process of formation there is a fusion and degeneration of the central part of the nodule, which is favored by the penetration of lymphatic elements.

linische Monatsblätter für Augenheilkunde

Reviewed by Dr. V. MORAX.

*February.***utic Results of Sub-conjunctival Injections of Sublimate, by Dr. E. SCHULTZE.**

near 1892, when injections of sublimate were introduced therapeutically by Reymond, and popularized by Abadie they have been frequently used at the Strasburg ophthalmic clinic. Schultze publishes the results obtained there. In 10 cases of non-syphilitic central choroiditis sub-conjunctival injections produced very marked improvement. In one case of myopia no change resulted. In 6 cases of disseminated choroiditis treated in this way 2 only were improved. In 6 cases of choroiditis of the vitreous with choroidal lesions the disturbance of vision was markedly diminished in 2 cases with this treatment. Improvement was quite marked in 2 cases of non-syphilitic choroiditis. In 5 choroidal complications of myopia injections were successful. On the other hand, they were very active in different forms of retinitis and syphilitic neuritis. In two cases of retrobulbar neuritis the progress, otherwise favorable, was not influenced by the treatment. Good results have thus been obtained at Strasburg in cases of the choroid, of the retina of the optic nerve, of the vitreous, and in irido-cyclitis.

tion of Myopia by Aphakia, by Dr. ED. PERGENS.

Pergens describes the results obtained from discission in 11 cases of myopia. No complication occurred. The loss of refraction after the operation varied from 14.5 D. to 18 D. The immediate vision was very manifest, both for distant and near objects.

of Suppurative Irido-choroiditis with Recovery and Complete Re-establishment of Vision, by Dr. ZIMMERMANN.

There was a man twenty-nine years old, with a history of attacks of urethral blennorrhœa with blennorrhœic rheumatism, and at present a urethral stricture. The last attack of blennorrhœa occurred three years before the present ocular disease. It commenced quite suddenly, with painful ocular symptoms and inflammation of the eye. On October 10, 1894, there was conjunctival

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chemosis, iritis with slight hypopyon, and some disturbance of cornea. The tension was normal. The vitreous was somewhat clouded, and the fundus of the eye could not be seen. The patient scarcely saw fingers placed before the eye. After the first sub-conjunctival injection of sublimate and an instillation of atropine there was an improvement, followed in two days by a relapse. From that time the sub-conjunctival injections, with instillations of atropine, were repeated every day or two. After the tenth injection, ten days after the beginning of the ocular disease, recovery was progressing rapidly, and the patient counted fingers at fifteen feet. The cloudiness of the vitreous disappeared progressively, and in four months normal vision was completely re-established ($V = \frac{15}{15}$).

The author attributes the infection to gonorrhœa, and thinks that this was a metastatic gonorrhœic irido-choroditis. It is needless to say that the recovery was due to the sub-conjunctival injections of sublimate.

IV.—Irido-cyclitis Following Cataract Operation; Secondary Glaucoma; Sympathetic Affection of the Other Eye, and Secondary Glaucoma of That Eye, by Dr. H. MERZ.

In a case operated upon by Dr. Schiess-Gemuseus irido-cyclitis with secondary glaucoma developed two months after the operation as the result of adhesion of the capsule to the lips of the incision. Eight days after, the other eye showed symptoms of sympathetic ophthalmia: exudative iritis, pericorneal injection, and headache. These symptoms were combated by enucleation of the eye of the affected eye upon and mercurial treatment. The sympathetic affection improved slightly, but there then occurred an elevation of tension, which was accompanied with symptoms of glaucoma: excavation and atrophy of the disk, narrowing of the visual field, while the symptoms of irido-cyclitis disappeared completely. The author thinks that the patient was predisposed to glaucoma.

V.—A Case of Phlegmon of the Orbit from Empyema of the Maxillary Antrum of Highmore, by Dr. H. MERZ.

A man, twenty-six years old, had dental caries of the first molar of the upper jaw; as the result of this, empyema of the antrum of Highmore, then phlegmon of the orbit of the same side with orbital neuritis. Drainage of the orbital abscess through the conjunctiva. Drainage of the maxillary sinus through the nose and the antrum cavity after extirpation of the necrosed roots. Recovery.

*March.***On Several Subjective Visual Perceptions,**

by Dr. W. VON ZEHENDER.

stent snows of a severe winter, such as we have just passed particularly favorable to the study of a subjective visual phenomenon which occurs when one walks in the daylight through a field covered with snow. This phenomenon consists in the appearance of the visual field of a great number of brilliant spots, which appear to the observer like a swarm of gnats. This perception has been compared to miniature fireworks. Purkinje has very carefully studied these subjective phenomena, and he distinguishes the brilliant spots, *muscae volatantes*. Purkinje likens the brilliant spots to the sparks produced by pressure on the eyeball, and supposes that they are produced by an electrical process, with its seat in the nerve cell. As for *strobilae*, he states that they are produced by visible blood vessels in the interior of the eyeball. The difference between these phenomena consists in their appearance and disappearance. The brilliant spot, the brilliant spots only occurring in the light, and *strobilae* being displaced from one point to another and appearing in the dark. Zehender likens the phenomenon of the spots to scintillating scotoma.

On the Etiology of Detachment of the Retina,

by Dr. OHLEMAN.

The author describes a case of a patient, sixty years of age, employed at harvest time who was obliged to carry sacks of grain weighing from 60 to 65 kilogrammes, and who after carrying many such sacks was suddenly seized with a disturbance of vision and detachment of the retina. The interesting fact in this case was the decision to which it gave rise. The patient claimed that the detachment was caused by his work, and the tribunal upheld him. The author has found no cases with similar etiology in treatises on ophthalmology, and he thinks that the detachment was caused by a disturbance occurring between the choroid and the retina.

*April.***On the Etiology of Trachoma and Chronic Blennorrhœa of the Conjunctiva,**

by Dr. K. HÖR.

From ophthalmological examinations, Horr arrives at the singular conclusion that trachoma and chronic conjunctival blennorrhœa are caused by the same agent, and that the etiological agent is the gonococcus.

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II.—**On Subjective Visual Perceptions**, by Dr. W. VON ZEHENDER.

Shadows of the Retinal Vessels and of the Entrance of the Optic Nerve.—The phenomenon of Purkinje is well known since the author has described it.

To perceive it, Purkinje gives several methods. The eyes are closed and turned toward the sun, and the fingers are moved in front of the lid, so as to cause alternate shadow and light. The image of the retinal vessel will then appear progressively. Another method consists in keeping the eyes open and bringing the finger of a candle near the eye and passing it before the eye from the side without fixing it. The candle may also be left at the side so that the luminous rays fall obliquely on the eye. Finally, the eye may be strongly pressed, or a galvanic current passed through it. Such are the methods as indicated by Purkinje. Zehender has never succeeded in these experiments. On the other hand, he is now able to see the shadow of the retinal vessel without any aid. His first discovery of this was quite accidental. On awakening from a light sleep with an open book on his knees, the surface of the book was white and well illuminated, he immediately perceived the shadow of the retinal vessel, and a dark spot corresponding to the optic nerve. Since then he has been able to repeat this experiment at will. Finally, in opening both eyes two images are seen, corresponding to the two retinae, and which, according to the convergence of the eyes, are separated from each other, or converge. The subjective perception is produced in Zehender's experiments when he opens the eyes, after keeping them closed for a certain time; the image appears from the abrupt passage from shadow to light, and Zehender explains it by Hering's theory of the assimilation or disassimilation of white and black. Zehender has never perceived the movement of circulation, nor did Purkinje. The shadow of the shadow has always been black. On substituting colored paper for white paper Zehender has never been able to obtain phenomena of contrast.

III.—**On Color Scotomata**, by Dr. R. HILBERT.

Many observations of color vision are found in medical literature, but in these cases the color sensation extends to the whole field. Cases of color scotoma are much more rare. Hilbert describes a case of a woman thirty-six years old who complained of color phobia and subjective scotoma. This scotoma was projected on bright surfaces, and was of a reddish-yellow color. The patient had lesions of the choroid (atrophic foci with peripheral pigmentary

of this choroiditis could not be established, but the secondary eccentric, corresponded to none of the choroidal foci. Later, the scotoma had assumed a gray color, and three months later it disappeared. Perimetrical examination could not be made. Hilbert has only found two cases, one of Szokalski and one of Williams, which were in any way similar to his case.

May.

On Glaucoma After Cataract Operation,

by Dr. H. PAGENSTECHER.

Glaucoma may appear shortly after cataract extraction, or, on the contrary, a long time after it. But in the latter case the glaucoma cannot be attributed to the operative intervention. Pagenstecher has only studied cases which develop a short time after cataract extraction, which was extraction, discission, and discission of cataract. Symptoms of glaucoma may develop in eyes which have never before shown any symptoms of hypertonia, but in eyes which had already had attacks of glaucoma. Symptoms may appear during healing of the operative wound. Pagenstecher has found it in some cases, generally the first or third week after operation, but after instillations of atropine. Glaucoma may come on the night with the symptoms of more or less pronounced hypertonia, slight disturbance of the cornea, and slight pain. The cicatrix may appear somewhat raised up, especially at the corneal flap. Repose in bed, warm applications, and administration of salicylate of soda generally produce rapid relief. If not, instillations of pilocarpine are given. As a rule, the eye returns to the normal in two or three days. Rarely, it is necessary to give sub-cutaneous injections of morphine.

Glaucoma may also be seen the second, third, or fourth week after operation in eyes which have to that time shown no symptoms of glaucoma. In particular in eyes which, without escape of the aqueous humor, presented marked hypertonia.

When, also, the hypertonia is accompanied with signs of inflammation, increase of tension is in general not very great, and atrophied in these cases.

When the glaucomatous phenomenon may be looked for in the presence of the cortical masses, but glaucoma may also develop in the presence of lens débris in cases, for example, where the lens was

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extracted in the capsule. It is not caused by pinching a flap capsule. The prognosis is, in general, good, except in case hypertonia is accompanied with serous iritis. It is, then, of tage to perform paracentesis of the anterior chamber to restore normal tension. Pagenstecher has only seen two cases in vision was completely abolished a short time after the operation consequence of glaucoma.

From these facts the practical lesson may be drawn that atatics should be used with prudence. When the iris is not inflamed and if it reacts well to light, it is far better to avoid the mydriatics.

The symptoms of glaucoma which occur after discission of a juvenile cataract, as a result of the swelling of the lens masses, are well known. They are combated by paracentesis and escape of lens masses.

Glaucoma, as the result of discission, was mentioned by Græfe twenty-six years ago. It is, in general, not rare to see attacks occur a short time after the operation. They are accompanied with pain and disturbance of the cornea. The more intense attacks are rarer; but rapid glaucoma may occur. It is best to prescribe pilocarpine before discission, if there is no particular reason for using atropine. When the attack has developed, salicylic soda may be used with great advantage. Pagenstecher was obliged to have recourse to operation three times. This was done in a puncture of the anterior chamber near the sclero-corneal junction. The results of this anterior sclerotomy have been so favorable that Pagenstecher has never had occasion to employ iridectomy recommended by Knapp.

Iridectomy in these cases is frequently difficult to perform, difficult to seize the iris with the forceps, the vitreous escapes from the wound, and the reduction of the borders of the iris often presents very great difficulties.

Glaucoma, which occurs a long time after operation, is in a peculiar manner. In this case, iridectomy is an important aid.

II.—On Winking as an Indication of Ocular Fatigue by Dr. R. KATZ.

Fatigue of the eye from reading is caused by excitation of the lowering apparatus :

The internal muscular, from accommodation.

The external muscular, from convergence.

from the luminous rays, and the conjunctiva from

l excitation of these apparatus produces asthenopia, divided into muscular, accommodative, and retinal or asthenopia. It may be asked if this subjective fatigue is objectively, and if it may be measured in any way. Fick's experiments performed with a registering apparatus showed that in reading at a distance of 30 centimetres the number of winking per minute was 1.8 with electrical illumination, 4.8 with bright, and 6.8 with weak illumination, which only per cent at 18 centimetres.

Consequently, the frequency of winking is an objective indication of fatigue.

Emphysematous Conjunctiva, by Dr. BORTHEM.

The author has had a patient seventy-four years old, with bullous emphysematous conjunctiva, pharyngeal mucous and a conjunctival cicatrix with a corneal opacity, which he considers the remnant of a conjunctival

of Optic Neuritis from Stasis and Unilateral Origin, by Dr. RAKOWICZ.

The patient, seven years old, attacked in 1893 with influenza with otitis media and otic localization. Since then suppurative discharge from the right ear. In December, 1894, aggravation of the otitis media, and fever. Rest in bed. After several days, immediate appearance of diplopia. Ocular examination showed the sixth nerve of the right side and a "Stauungs-ophthalmie" of both eyes; $V = \frac{2}{30}$. Stacke-Schwartz operation (open-stoid cells). The day after the operation the diplopia disappeared. Six days later, normal papilla and $V = 1$.

Recueil d'Ophthalmologie

Reviewed by Dr. DE BOURGON.

August, 1894.

Is a Lymphangitis of the Eye Which Is Cured by Sclerotomy, by Dr. GALEZOWSKI (to follow).

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**II.—On the Treatment of Ocular Diphtheria with Pe
Oil,** by Dr. VIAN.

(See *Annales d'Oculistique*, Vol. CXXII., p. 122.)

**III.—General Considerations of Cataract Operation
dren,** by Dr. DOLARD.

In this article, the last chapter of a thesis written in the direction of Professor Gayet, the author recommends operation for congenital cataract as early as possible, in order to avoid the inconvenience to the child of a bad optical education (myopia, strabismus and nystagmus). In very young children extraction should be performed with complete chloroform narcosis.

In soft cataract superior kerato-kystitomy is the preferred method for extraction. In zonular cataract an optical pupil is usually made.

September.

I.—Treatment of Granular Conjunctivitis by Electrolysis, by Dr. MALGAT.

(See *Annales d'Oculistique*, Vol. CXII., p. 136.)

II.—Double Spectacles with Superimposed Glasses for Patients Who Have Been Operated upon for Cataract and Hypermetropes, by Dr. GALEZOWSKI.

Persons with high degrees of hypermetropia who have reached a certain age, and those who have been operated upon for cataract, require two pairs of glasses, one for near and the other for distance vision. To obviate this inconvenience, Dr. Galezowski has since 1887, had double spectacles made with superimposed glasses. These are of great service to the patients.

As the superimposed lenses soil easily, it is necessary to clean the rock crystal cut perpendicularly to the axis for the complete lenses. With the exception of this slight inconvenience, which is easily avoided, these special spectacles are as easy to wear as ordinary ones.

III.—Retrobulbar Neuritis from Late Hereditary Syphilis, by Dr. VIGNES.

(See *Annales d'Oculistique*, Vol. CXI., p. 453.)

**IV.—Glaucoma Is a Lymphangitis of the Eye Which Is
by Repeated Sclerotomies,** by Dr. GALEZOWSKI (to follow).

V.—Note on Conjunctival Papilloma, by Dr. SAULA.

October.

Ophthalmological Studies, by Dr. CHAUVEL.

opia.—Hypermetropia complicated with amblyopia is hypermetropia of a high degree.

at hypermetropia is always congenital, but the author is convinced of this.

metrical examinations the monocular field of vision was narrowed in 183 cases.

ses of hypermetropia examined, only 22 had normal frequently the lenses which improve vision are relative-ly, and in number far inferior to the degree of hyper-

n.—Regular astigmatism is frequent in hypermetropia.

is Associated with Upward and Downward Rotation, by Dr. SAUVINEAU.

es d'Oculistique, Vol. CXII.)

na Is a Lymphangitis of the Eye Which Is Cured by Repeated Sclerotomies, by Dr. GALEZOWSKI (*to follow*).

November.

course of Clinical Ophthalmology, by Dr. PANAS.

duction of an ocular disease two conditions are neces-

; 2d, the seed.

point of view of the soil, the age, sex, and condition of the patient must be considered; from the point of view whether micro-organisms or toxines are to be considered.

idea of the poisoning of the blood by toxines comes the indication of making the interior media antiseptic, we have recourse to antiseptics (mercury, iodoform,

na Is a Lymphangitis of the Eye Which Is Cured by Repeated Sclerotomies, by Dr. GALEZOWSKI (*to follow*).

Ophthalmological Studies, by Dr. CHAUVEL.

igmatism.—Astigmatism is most common in students. In the following figures, I refer to the original article.

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December.

I.—Glaucoma Is a Lymphangitis of the Eye Which Is Cured by Repeated Sclerotomies, by Dr. GALEZOWSKI.

In simple glaucoma, where the symptoms commence at the anterior segment of the eye toward the optic disk, the use of repeated sclerotomies, with or without iridectomy, furnishes the most satisfactory results.

In secondary glaucoma with dislocation of the lens, extrusion of the lens arrests the inflammatory symptoms, and, in some cases, the glaucomatous disease.

From the etiological standpoint, the glaucoma, which is frequently associated with arthritic conditions, more frequent in women than in men, depends essentially upon the form of the eyeball. In myopia, glaucoma is very rare, and this fact is due to the presence of a posterior staphyloma. In support of this opinion the author publishes a case of complete excavation of both papillæ, a case of anterior staphyloma and myopia with no sign of glaucoma, and a second case in which there was monocular glaucoma with pressure in one eye and myopia with a large posterior staphyloma in the other eye.

Sometimes acute glaucoma is not arrested by an iridectomy because the operation was badly performed. Sometimes the inflammatory symptoms developed by an injury which threatened glaucoma are arrested by sclerotomy. The latter cause the glaucomatous pain provoked by dislocation of the lens, either transient or permanent, to disappear.

In some cases, where iridectomy is of no avail, repeated sclerotomies will cure glaucoma. Two cases are given in support of this.

The improvement produced by sclerotomy is not always permanent; there are sometimes relapses, and the sclerotomy should be repeated. The author has been successful in operating in several cases. Sometimes sclerotomy provokes symptoms of subacute glaucoma which necessitate iridectomy. In hemorrhagic glaucoma blood effusions are completely arrested by repeated sclerotomies. In another case sclerotomy only arrested the symptoms for a short time, and they reappeared with greater violence than before, so that it was necessary to renew the sclerotomy.

II.—Spontaneous Pseudo-hemorrhage of the Conjunctiva, by Dr. F. MATHIEU.

This was a case of papilloma which had undergone angiodysplastic transformation, and which was situated on the left upper lid.

eous Mydriasis; Cured by Injections of Strychnine, by Dr. MALGAT.

Simultaneous injections of sulphate of strychnine, in the diligramme, were made, with a Pravaz syringe, daily for the ninth injection the pupil of the affected eye was normal dimensions.

ular Ophthalmoscopic Image, by Dr. SCHWARZCHILD. As a white crescent upon the retina which, during the of the erect image, takes the form of a circle. The is due to an alteration in the internal structure of the

IV.—BOOK NOTICES

BOOKS AND THESES

Purulent Ophthalmia from a Prognostic and Point of View, by Dr. AXENFELD. (Pub. by *Engelmann*,

important memoirs which Dr. Axenfeld has devoted to ophthalmia appear to us to be worthy of a detailed account of the interest which is attached to the subject in which the author has treated it.

Ophthalmia is a rare affection, as one can observe in all pyæmic affections, severe or slight. Axenfeld has cases of *metastatic ophthalmia in the course of puerperal* which is a case of his own. In 11 observations a bacteriological examination has been made: 9 cases have proved the streptococci, 1 case diplococci, and 1 case the staphylococcus. From all these facts are brought out, from a clinical view, the following conclusions: the lowest age of the from thirty-one to thirty-two years; they are generally when the infection is introduced during labor. The first metastatic ophthalmia consists in a diminution of acuteness which very rapidly, generally in twenty-four hours, culminates in complete blindness, but never causes the sudden blindness of typhoidism. The affection is usually painful, the pain lasting for some hours or some days. In 2 cases only was the affection painless.

It presents the lesion of panophthalmitis, and spontaneous resolution is the rule. In 63 cases the affection was unilateral 41

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times, and 22 times bilateral. Sympathetic affection consisting in unilateral metastatic ophthalmia was not observed, while the affected eye has often been the site of a relapse characterized by the appearance of the pain, necessitating enucleation.

All the patients in whom both eyes were nearly simultaneously affected died in from one to four days after the onset. A case of Hirschberg terminated in recovery. Of 41 patients suffering from unilateral metastatic ophthalmia, 14 recovered and 27 died. Formerly, we believed that there existed a correlation between cardiac lesions and metastatic ophthalmia. As a matter of fact, endocarditis is frequent, but far from being constant. In 51 cases the endocardium was healthy; 13 times in 51 cases there was no other metastatic focus. Anatomical examination of the eye teaches us that in unilateral ophthalmia the point of deposit of the thrombus of one of the membranes (retina, choroid) of the eye is while in bilateral ophthalmia retinal emboli oftener occur.

As to the ophthalmoscopic lesions, one has only very rarely an opportunity to observe them. Litten and Hernnheiser have observed multiple retinal hemorrhages without embolism of the large vessels. In bilateral ophthalmia, retinal embolism has almost always been found; but Virchow and Wagenmann have also demonstrated a primary lesion of the choroid.

In unilateral metastatic ophthalmia, it is generally the cornea and the iris which is the primary site of the lesion.

Metastatic ophthalmia in septicæmic or pyæmic surgical infections is a little less frequent than in the puerperal state. Axelsen has found 46 cases, of which 4 are his own. The course is practically the same as in puerperal metastatic ophthalmia. The period of appearance of the ocular affection varies from one to forty days, counting from the date of infection. The visual troubles are established rapidly and progressively; sudden blindness has never been observed. The affection is not painful at first; pain may appear later, or not at all. Usually, it is a panophthalmitis, with perforation. In 4 cases only there was a direct transition to atrophy of the globe. Bacteriological examination made in 6 cases has shown streptococci 3 times, staphylococcus albus twice, and bacilli once. In a single case of Deutschmann the sound eye was attacked by sympathetic troubles one month after the début of the ophthalmia. In 44 cases, 14 times the affection has been bilateral, and 30 times unilateral; 29 patients died, 15 were cured. Death has been most frequent when the affection has attacked both eyes. End

ed 7 times in 16 autopsies. The ophthalmoscopic lesions
ning have never been observed. As to the histological
cases of bilateral ophthalmia there have been 2 cases of
llary emboli of the retina, and 1 case of the optic nerve.
of unilateral ophthalmia, Litten has found the site of
in the choroid. In 4 cases the suppurative lesion lay in
hood of the equator.

Ophthalmia in the infectious diseases has been little
Axenfeld contents himself with stating that the publica-
is subject are weak and the autopsies wanting. We
at in the course of influenza, scarlatina, measles, diph-
lpx, erysipelas, glanders, and recurrent fever it is
ave lesions of the choroid or retina.

Ophthalmia in Cryptogenetic Pyæmia.—He designates
ame of cryptogenetic pyæmias the medical infections
wn point of entrance. Chilling seems to play a part in
ion. He puts in this list of facts all the cases of ulcera-
ditis, all cases which follow the type of acute articular
all the affections which develop like typhoid fever,
or miliary tuberculosis. Axenfeld has found 27 ob-
metastatic ophthalmia occurring in these conditions,
re personal observations. The ophthalmia is developed
t to the eighteenth day of the infection. The duration
ion in the fatal cases has been from one to three weeks.
ouble is developed rapidly and progressively: 13 times
itis with perforation has been noted; 6 times the pas-
om suppuration to atrophy of the globe.

e only has sympathetic ophthalmia been seen to develop
ophthalmitis (ulceration and perforation). The affection
ateral 12 times; 15 times it has attacked only one eye.
of the first category died. Of the second, 10 recovered.
was found in 10 cases out of 12 autopsies. As to the
of the lesion, in the unilateral cases it is at one time
ne time the choroid or the iris; in the bilateral ophthal-
politic lesion is found primarily in the retina. The pneu-
ems to play an important rôle in this group of meta-
almias. Axenfeld has found it in two cases. Moreover,
coccus has been found twice, and the streptococcus once.
ond part of his memoir Axenfeld has studied critically
eal conditions and the bacteriology of septic embolus of
hat is the value of the character of intra-vascular micro-

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organisms from the point of view of diagnosing endogenous infections? Wagenmann, in studying suppuration of the eye consequent upon cicatrices of operations or prolapse of the iris, was satisfied of the existence of exogenous infection starting from the wound, his conclusions being founded upon the infiltration of the wound with the existence of micro-organisms about it, and also upon the existence of micro-organisms in the choroid and retina, and their absence from the interior of the vessels. The argument of Wagenmann is of great value, and Axenfeld cites several observations of metastatic ophthalmia where, necessarily, the infection was endogenous in origin. Where the absence of micro-organisms from the interior of the vessels was noted.

It is not impossible, however, and certain clinical facts tend to prove it, that endogenous infection might also be produced in the conditions studied by Wagenmann—that is to say, in the conditions of inherent opacities of the cornea, or even following operation of the cornea. It is certain, nevertheless, that these endogenous infections form but a small part of post-operative infections.

Axenfeld calls attention to a mistake which was made when intra-vascular masses of streptococci were called microbic. If the eye is taken out twenty-four hours after death, it happens that during that time the microbes have multiplied.

A post-mortem proliferation takes place which is easily recognized by the absence of the signs of reaction (leucocytes, lesion of the walls of the vessels) at the spot of the mass of microbes. Axenfeld thinks that in those cases of metastatic ophthalmia the infection first produced an infectious embolism of the vessels of the retina. This hypothesis is in contradiction to the progressive evolution of the visual trouble, which, however rapid, is never violent and is not similar to that as in embolism. Moreover, Litten is the only one who has observed granular detritus about the organisms. In some cases, more than in others, the purely microbic nature of the embolic mass is absolutely certain, as stated at first. Axenfeld admits that these microbic bundles arise most often from the endocardial vegetations; more rarely, they may come from veins passing through the point of primary infection. They arise from compact masses found in the blood, circulatory troubles of the eye favoring, perhaps, the development of endogenous infection. In most of the cases where the affection has been bilateral, bilateral lesions of the retina have been found. Besides the predisposition to the eye caused by the physiological narrowness of the canal of the eye, there is perhaps an elective action of the streptococcus and staphylococcus for the retina.

in summing up, that purulent metastatic ophthalmia the different forms of pyæmia is, in one-third of the cases indicated by ulcerative endocarditis. In one-third of the cases metastatic ophthalmia is bilateral, and it is only this bilateral form which obliges us to give a fatal prognosis. Unilateral metastatic ophthalmia (except that of puerperal fever) accompanies, frequently, severe cases of pyæmia, above all in the cases of cryptogenetic pyæmia, transferable to the lungs or the meninges. It may be the only metastatic affection. In bilateral metastatic ophthalmia the ocular affection is only metastasis in the area of the carotid. It cannot be the result of the dissemination of large embolic masses, for these would cause metastasis in other parts of the head. In bilateral metastatic ophthalmia it is the retina which is affected, and a large embolus could not pass into the two central branches of the fine capillary vessels occurs very much more frequently in these cases, this being very much more in accord with the nature of the affection: rapid but not sudden blindness. While in cases of metastatic and surgical metastatic ophthalmia we find, above all, the pneumococcus, and sometimes the staphylococcus, in the cases of metastatic origin the pneumococcus seems to play an important part. In metastatic ophthalmia caused by the pneumococcus passes more often from the eye to the brain, and ends in atrophy without panophthalmitis. In metastatic choroiditis is bad, since it is very often the choroid which is primarily attacked. It is, therefore, preferable to reserve the term metastatic ophthalmia for the cases under the designation of metastatic ophthalmia. The complete bibliographic index finishes this interesting work.—

Sarcoma of the Lachrymal Gland, by M. F. SCHAEFFER.
(Thesis of Giessen, 1895.)

The patient was a man, fifty-one years, with a history of influenza three months before he entered into the service of Professor Vossius. At that time he noticed a swelling of the external portion of the right eye, a swelling which increased without pain. It proves to be slightly resistant, without adherence to the soft parts of the eye, and seated just below the orbital ridge, situated in the lower site of the lachrymal gland. The tumor is the size of a walnut, the upper eyelid cannot be elevated, and elevation of the tumor is quite limited. On turning the lid, one sees the tumor, the surface of which appears to be smooth, but on palpation proves to be firm. No adherence to the globe of the eye, which is normal. The tumor was removed on July 5, 1894. In February, 1895, it had recurred.

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Gross examination showed the existence of several nodules thickness of the lachrymal gland. These nodules were formed of tissue quite rich in capillaries, and corresponded to the type of round-celled sarcoma. The vascular walls were thin, and showed at certain points, hyaline degeneration.

The author has followed his observations by a complete tabulation of tumors of the lachrymal gland.—V. MORAX.

Twenty-fifth Report of Ophthalmic Clinic of Prof. Hirschberg. (Berlin, 1895.)

In this interesting report, Professor Hirschberg gives us a full account of his twenty-five years of practice; he shows us the operative procedures his experience has led him, and what advantages his labors have received in surgical intervention. To complete the description of the operating theatre and the sterilization apparatus. The numerous Greek and Latin quotations interspersed with the text, a study of the history of specialization among the ancients, Greeks, and Romans, prove to us, moreover, that the progress and study of ophthalmology is not incompatible with erudition.—V. MORAX.

Clinical and Therapeutic Treatises on Hysteria, by Dr. G. DE LA TOURETTE. (Plon and Nourrit, ed. Paris, 1895.)

This is a work in two handsome volumes which contains a reproduction of Professor Charcot and 63 cuts in the text. It does not enter into the scope of our journal to analyze even casually the contents of Dr. Gilles de la Tourette, but hysteria comes close enough to the science of ophthalmology for the work to be interesting for a specialist to consult. It is a strong work, and does great honor to its author.—V.

MEDICAL JOURNALS

Edema of the Upper Eyelid in the Course of Scarlet Fever by Mr. SIDNEY PHILLIPS. (*Brit. med. Journ.*, Jan. 26, 1895.)

Case I.—H. N——, girl twelve years of age, was admitted to hospital September 5, 1892. She had a very severe attack of scarlet fever, with temperature 104° (Fahrenheit) during several days of delirium. On September 14 the temperature fell to 100° , but rose again September 15 to 104° , and on September 16 the left upper eyelid became red and cedematous to such a degree that it could not be closed.

At the same time pus formed in left ear. September 18, sea ceased, but the mastoid process became painful and the of the upper eyelid increased. There was neither exoph- or injection of the conjunctiva, but the œdema extended k.

er 21 the swelling had diminished, but, as there existed plebral fluctuation, an incision was made on October 10, e of a little pus. One or two weeks later the patient was cured.

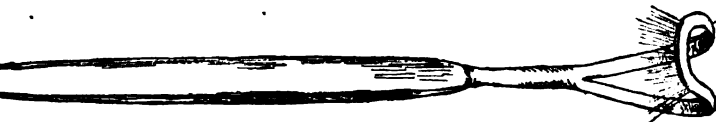
a little albumen in her urine, but only at the time of the eration of the fever.

—W. W—, eight years of age, had scarlet fever two o; albumen in the urine, and a swelling of the left upper great that it was black and blue. She could not herself eye, and the conjunctiva was injected. The whole termi- nflammation of the middle ear, which perforated the tym- After that the swelling disappeared.

—V. S—, suffering from scarlet fever, had, ten days ssion, an intense swelling of the right upper eyelid. days later, the tympanum was perforated without pain. swelling diminished. The patient never had albumen. ases are not connected with the presence of albumen in but with the supuration in the middle ear.—DE B.

A Lid Speculum and Douche, by Dr. FAGE.
(*Gazette Médic.*, Picardie, Feb., 1895.)

ater part of douche specula which have appeared in recent been provided with a blade pierced with little holes only, o up easily and give an insufficient stream. Fage has had nent constructed which, while retaining the form of a



eculum, has a blade with a large finestra which carries nterior border a groove with blunted edges, by which the pes, not in fine jets, but in a sheet; thus an abundant of the conjunctival cul-de-sac can be obtained. igation, convenient for disinfection preparatory to opera-

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tion, renders genuine service in the treatment of conjunctivitis and keratitis.—V.

A Case of Congenital Unilateral Ptosis, by Dr. MARY PUTNAM JACOBI. (*Medical Record*, February 23, 1895.)

Dr. Mary Putnam Jacobi reports a case of unilateral congenital ptosis in a child a year old, well developed in every respect, except the defect of the left eye. This was apparently smaller than the other, and closed by the fall of the upper lid. Not only was the elevator palpebræ evidently paretic, but the orbicularis seemed undeveloped, a fact which suggested that the fault of the lid was due to imperfect development of the muscle rather than to paralysis of the nerve.

The eyeball was subject to nystagmic oscillations; vision was at present normal, pupils equal, and reacting each normally to light. No other ocular muscle affected.—S.

Legislation for the Prevention of Blindness, by Dr. C. W. H. MAY. (*Med. Record*, N. Y., Feb. 16.)

After reviewing the methods in vogue for the prevention of congenital *phthalmia neonatorum*, laying stress upon the success following the introduction of Credé's method of prevention, the writer introduces tables showing the cases treated in the various hospitals and clinics of New York. He strongly urges the necessity for effective legislation for the prevention of blindness. C. W.

Etiology and Treatment of Internal Strabismus, by HOWARD F. HANSELL. (*Journal American Med. Association*, February 25, 1895.)

Concludes that the amblyopia of strabismus is congenital, and is not improved in cases of marked deviation by tenotomies; that in monocular squint the squinting eye always turns upward, and in alternating squint the non-fixing eye turns up. He thinks that atropia and full refractive correction are, in many cases, curative. C. W.

A Suggestion as to the Treatment of Penetrating Wounds of the Ciliary Region and Lens, by Dr. ROBERT L. RANNEY. (*New York Medical Journal*, February 25, 1895.)

Penetrating wounds of the ciliary region and lens in the majority of cases lead to the loss of sight. Sympathetic ophthalmia usually has its origin in an injury of this region.

not in favor of temporizing, the author points out the fact that traumatic ophthalmia rarely occurs in these cases within three weeks after the injury. In the meantime much may often be done to soothe irritation and avert the loss of the organ. In many instances the chief source of irritation is a lens wounded in the accident, which by swelling has become enlarged and is pressing on the inflamed ciliary body and iris, and by stretching the wound the foreign body, provides continuous entry for infecting matter. Here the lens should be removed. Three cases are recorded in which the eye was saved and valuable sight restored after apparently been lost.

The most favorable cases for operation are those where the wound is small and located at the corneo-scleral margin, and where it is not necessary to enlarge the wound, but is also the most natural point of access of the lens.—BOYER.

On the Third Nerve Associated with Disturbance in the Region of the Seventh Nerve (Syphilitic Origin).—Dr. DINEUR. (*Arch. méd. de l'armée belge*, Jan.)

The patient, twenty-six years of age, admitted infection of not long standing; presented the complete picture of paralysis of the third nerve. Moreover, salivary and gustatory troubles showed that the sympathetic plexus, branch of the facial, was also involved.

The influence of Gibert's syrup the patient completely re-

covered from periostitis of the cranium, demonstrated by the operation. This periostitis, very probably, was situated at two points. The first was situated at an indeterminable point in the cranium, of the third nerve, the second affected the periosteum of the temporal canal by which the corda tympani passes by the tympanic membrane.

Massage of the Lens for the Ripening of Cataracts. by Dr. PIPINO. (*Med. Rev.*, Feb. 2.)

The method most employed is that of Foerster. The principal objection attached to it is that the iris is mutilated, and that the cornea may be injured by the massage.

The process of direct massage invented by Boern Bettman is the method employed. M. Pipino has practised this operation seven times and has never had occasion to regret the intervention.

One of the principal objections that has been made to this method is the possible rupture of the superior ligament and the dislocation of the lens; this accident is only due to the clumsiness of the operator. It is only necessary to use gentle pressure, which will be

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sufficient to produce a traumatic cataract in twenty-four hours. In the majority of cases the lens will be opaque by the end of the week.

In the cases observed by the author four weeks later, sim- traction proved to be practicable, and this was followed by g- sion. No iritis. This affection had been guarded against instillation of atropine.—DE B.

V.—MISCELLANY

NEWS

There was held on June 7 last, at Amsterdam, under the pre- of Professor H. Snellen, the second meeting of the preparato- mission for the International Conference concerning the app- of medicine on railroads and ships.

The discussion, at this meeting, turned upon the necessar- ures to test the acuteness of vision of railroad employees. W- return to this discussion and the reports of H. Snellen, and Westhoff which were read there, *à propos* of the Intern- Conference, which is to take place at Amsterdam in the mo- September next.

The programme of the Conference, moreover, comprises t- ject of the personal medical service of transportation compan- hygienic measures to be taken in the interest and safety of tr- (ventilation, dining-car service, bathing, disinfecting, etc.).

The Societies and the medical members have invited the- portation companies to send representatives to this conference.

CORRESPONDENCE

MY DEAR COLLEAGUE:

In the January number of *Annales d'Oculistique* (English e- which I have just received, I find an article by Dr. A. Da- "Vascularization of the Anterior Surface of the Lens," w- observation that he had not been able to find an analogous- the whole (?) of ophthalmological literature.

In my communication "Observations on 400 Cataract Extr- Performed by Prof. O. Haab, of Zürich," in *Archives of O- mology*, edited by Drs. Knapp and Schweiger (XXV., page- 109), there appears a similar case. [The article of Dr. A- abridged in the English edition, Vol. XXII., p. 462, and t- is not included.]

The observation was made in 1890, and was regarded as a- larization of a papillary membrane and not of the lens itself- am convinced that the case of Dr. Darier was of the same kin-

After iridectomy the vessels collapsed and no longer co- blood, the best evidence that their origin was in the iris. A- sult of interstitial keratitis blood vessels had developed in t- nea. Observations like these two are not common.

243 CHARLES ST., BOSTON, MASS.

lit of first describing the corneal vessels of interstitial
longs, not to Hirschberg, but to E. Nettleship.

Sincerely yours,

DR. THEO. ARNOLD.

**Anterior Sclerotomy and Other Operations Succeed-
Iridectomy in the Treatment of Glaucoma.**

(Open letters in the *Annales d'Oculistique*.)

Parinaud persists with rare constancy in claiming the pater-
ne revival of tapping the vitreous in glaucoma. That is
fair, and I will content myself with recalling to his mem-
ory the communication of the Society of Ophthalmology in 1885, when he
first communication, my note of the 20th of July, 1881, to
the Society, and the discussion which took place on the
subject. Giraud-Toulon, president, and Dr. Le Fort. Then in
the communication of Dr. Parinaud the order of the day
was adopted and the discussion suspended, otherwise I would have
known that which I have had occasion to expose since: that is to
say, that posterior sclerotomies, linear or angular, even sclerecto-
my, are only a temporary effect. Fibrous organization of the im-
treated vitreous is the result, as has been proved to me by histolog-
ical following experiments in the laboratory. Practically,
the relapse comes on regularly after a few weeks or a few
months and rarely more. The relapse has been especially marked in
cases of sclerectomy, where it has manifested itself by a violent
onset exactly resembling the first relapse after tapping,
resembling the primary attack.

What can we say of the practice which consists in recommend-
ing sclerectomy following the puncture with the needle periodi-
cally (which the patient, if necessary, can perform him-
self). I greatly fear that the author here has not been very exact,
in the case of accidents of sepsis and sympathetic troubles, while he
seems to fear nothing but the incomplete cicatrization of the
parts.

Having experimented a great deal and invented a little, I
ought to avow my return to iridectomy, rendered practical
in many cases by the incision of Gayet, or by the aid of the linear
incision. No operation has an effect so durable, not even the
tapping, contrary to what I had hoped in proposing it and
the first years that followed. The excision of the iris enters
into the duration of the success, without doubt by the final
rest of a field of innervation, while sclerotomy only relieves
the eye, and only until nervous regeneration.

Anterior sclerotomy, what should be the site and shape, "it
is reserved as an accessory measure with its own proper in-
dication. Preceding an iridectomy, it causes prompt re-establish-
ment of the anterior chamber, when that fails, and facilitates the
operation. Practised soon after iridectomy, it prevents the prolapse
of the iris and favors good cicatrization in those cases where one may
hesitate. It is an operation still indicated in case of non-

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re-establishment of the anterior chamber after iridectomy, or the tension persists after that operation." Primary dislocation of the lens has already been recommended by Weber. (General Theories and Operations for Glaucoma: Chapter on Pathology of myopia and the Gland of the Aqueous Humor. *Archives*, 1891.)

DR. NICATI

P. S.—It is proper to recall that my "article on the cure of glaucoma by transverse equatorial sclerotomy" (Surgical Society of Boston, July 20, 1885), was subsequent to my previous physiological work, "Drainage of the Eye by Catgut" (Society of Biology, June 1877), and the primary credit is therefore due to the clinical work on equatorial drainage by Dr. de Wecker, dating from the same time, but communicated a little before to the Society of Biology. To Dr. Masselon is due the credit of looking up the exact history of the question.

Response of Dr. Parinaud: Dr. Nicati has often given evidence of his good intentions, but good intentions and scientific results are not the same things. He finds that I persist with a constant rare, etc. A constancy which manifests itself once in ten years is undoubtedly rare: as a joke, this is not bad. It is also in attending to be witty that he explains why he did not object to my communication in 1885. But what had he to object to? I mentioned him (p. 279 of the *Bulletin*), as I have always scrupulously mentioned all those who, to my knowledge, have practised, in whatever manner, tapping of the vitreous. I have even laid stress on the special principles of his operation, which is in some degree the antithesis of the one which I recommend. He excised beforehand "a large strip of the conjunctiva," made "at the level of the equator," an incision of the sclerotic, "3 to 4 millimetres," excises, if necessary, pressure upon the globe "until there is a hernia of the vitreous." That this operation may be bad I will not contradict: bad on account of the fibrous organization of the imprisoned vitreous body. I suggested something like this in saying that large cuts in the sclerotic, with hernia of the vitreous body, did give good results, probably on account of the cicatricial closure of the cut in the sclerotic. I have repeated time and again that anterior sclerotomy is only useful as a means of avoiding all inflammatory reaction at the location of the cut. Dr. Nicati does, on the contrary, everything that would bring about this reaction. Not that I know, not even himself, practises his operation. Then what does he want? He tries to establish his rights, in attributing the faults of his operation to the one I practise, and which he avoids and the avoidance of them. Though very clever, it does not demonstrate. Moreover, I have never said or thought that posterior sclerotomy could supplant iridectomy.

Dr. Nicati has done this with an evident desire to make his disagreement disagreeable; however, he does not excite my anger. There are many ways, I acknowledge, criticism to which I am sensible. Our friends find me exact! That makes me careful. Am I more careful than he?

PARINAUD

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

CONTRIBUTION TO THE STUDY OF OEDEMATOUS NEURITIS OF INTRA-CRANIAL ORIGIN

By Dr. **H. PARINAUD.**

Review of an article presented to the Ophthalmological Society of Paris by
Dr. Rochon-Duvigneaud.

Interest in this question has been renewed since the articles of Deutschmann appeared, which created a movement of thought in favor of a microbial theory for which all minds were prepared. This movement is, in my opinion, a step backward from the truth, but as I was formerly much interested in this question, my judgment may be prejudiced. It was, then, to be desired that the subject should again be discussed in France, as it has been in other countries, and that it should be discussed freely by an unprejudiced person. Dr. Rochon-Duvigneaud, with his well-known skill in histology, was perfectly qualified for this task, and thanks are due to him for his very careful study of the subject.

In the first part, the author gives the results of the histological examination of two cases, and compares his observations with those formerly made. Three very clear diagrams facilitate the study. The second part is devoted to criticism of the different theories.

I can only give a summary of the two cases, the details of which are treated in full.

*Case I. (Summary).—*A young girl, attacked several months with a progressive disturbance of vision, which ended in complete blindness. Typical papillitis in both eyes. Left hemiplegia following attacks of Jacksonian epilepsy.

On autopsy, glioma in the right region of Rolando.

Microscopical Examination.—Marked dilatation of the sheaths of both optic nerves. This was caused by oedema, situated between the sub-arachnoid tissue. There was no trace of fluid in the sub-arachnoid space.

There were no inflammatory phenomena in the oedematous sub-arachnoid connective tissue.

(A very clear diagram is given, much more explicit and more accurate than that printed by Wedl and Bock, which was reproduced by Wecker and Masselon.)

The projecting papilla presented no real oedema, which was due less to the long standing of the case. The papillary sheath was more fibrous, of denser appearance, and richer in nuclei than the normal. Marked sclerosis of the perivascular sheaths of the vessels; an analogous sclerosis does not exist in the optic nerve.

The optic nerve had reached an atrophic stage. The lesions were diffuse and irregular. The connective tissue, the sheath of the nerve and of the vessels was not involved. The disorganization of the nerve fibres had led to proliferation of the neuroglia in the nerve fasciculi, just as Wallerian degeneration of a peripheral nerve fibre is accompanied with multiplication of the nuclei in the inter-annular segment. The author does not think that the proliferation of the neuroglia cells should necessarily be regarded as inflammatory phenomena.

The atrophy of the optic nerve extended to the optic tract and the chiasm it was principally the central portions which were atrophied.

The region of the optic foramen was much less involved than the retro-bulbar and intra-cranial portions of the nerve. In view of the peculiarity already noticed, the significance of which I will discuss later.

Oedema of the sub-arachnoid tissue of the optic nerve is the best means of demonstrating the sheaths of the optic nerve.

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the author profits by this, in passing, to describe from the two very clear diagrams which he gives (a longitudinal and a transverse section) how the arachnoid acts at the cul-de-sac of the sheaths, the sutural fibres emanating from the dural sheath and pressing back the arachnoid to become fixed to the pia mater, etc.

Case II.—A young man died in 1890 from a cerebral tumor, the first symptoms of which appeared in 1882.

Ocular disturbance in January, 1888. Papillitis was found in both eyes at the end of 1889, and the vision was very weak.

On autopsy, a glioma was found the centre of which was in the region of the right anterior corpus quadrigeminum. There was no ventricular hydrocephalus, nor was there abnormal abundance of cerebro-spinal fluid. The chiasm was much increased in size, also the optic nerve, but there was little hydropsy of the sheaths. Here the principal lesions were situated in the papilla and the trunk of the optic nerve.

The papilla was projecting, studded with cells, and œdematous. There was perivascularitis of the large vessels, and, as in the preceding case, this perivascularitis was not present in the optic nerve.

The optic nerve was increased in size and crowded with cells, as is shown by a comprehensive diagram of a transverse section.

This increase in size was due, in part, to œdema, which was situated in the neuroglia partitions of the nerve (and not in the connective tissues), but principally to an accumulation of large cellular elements in the interior of the fasciculi of the optic nerve. Everything went to show that this was a proliferation of the neuroglia cells. The integrity of the connective tissue of the nerve, the normal contents of the vessels of the nerve, and the form of the elements in question clearly proved that this was not a leucocytic infiltration of the nerve.

While showing the advanced stage of the disease, as the lesions involved the entire extent of the optic nerve, these two cases were not of the same age, from the point of view of the lesions. The first represents a regressive stage, atrophy; the second, on the other hand, represents a stage of proliferation in which a slight amount of vision was still preserved.

Apart from their essential analogies, these two cases seem to

present differences of nature; thus, the neuroglia proliferation so active in Case II. does not appear to have existed in cases in which the nerve differed very little from what is seen in non-inflammatory atrophies.

I might have called attention to certain peculiarities in these cases, but they will better find their place and their significance in the study of the pathogenesis.

What is the pathogenesis of optic neuritis of intra-cranial origin? Does it imply a lesion of the expansions of the optic nerves and a descending alteration, as many physicians and strangers to ophthalmology, insist on believing; is it the result of a vascular stasis, as Türk and von Gräfe have thought; is it a mechanical origin caused by the excess of intra-cranial pressure and the forcing back of the cerebro-spinal fluid into the sub-vaginal space of the optic nerve, as Schmidt and Manz have said; is it the result of an infectious process, as Leber and Deutschmann suppose; is it a lymphatic oedema produced by the same causes and the same mechanism as oedema of the cerebral substance, of which the optic nerve forms a sort of prolongation, as I have upheld? This is what it is important for the clinician to know in order to establish the semeiology and the value of optic neuritis in cerebral affections.

It has been said a hundred times that optic neuritis is caused by the most diverse affections, situated in many different places, and that there is no use whatever in localizing it, but it is not useless to repeat it, because many physicians who have frequently observed, cannot renounce this idea that optic neuritis implies a lesion of the intra-cranial expansions of the optic nerve, and is the result of a descending process continuing to the papilla.

The explanation of neuritis by vascular stasis has no advocates, and it is useless to discuss it. There are, then, the theories of Schmidt-Manz, that of Leber-Deutschmann, and my own, which Dr. Rochon-Duvigneaud

In autopsies on persons with optic neuritis of intra-

origin, that which first strikes the attention, when proper precautions are taken, is a retro-bulbar swelling of the external sheath of the optic nerve, which is distended with a serous fluid. I have always found this swelling in sixteen autopsies with neuritis in which I have sought it, but it existed in very different degrees. It may, indeed, exist without optic neuritis.

When Schwalbe established the communication of the vaginal space of the nerve with the lymphatic spaces of the brain, Schmidt and Manz thought that they had found in this dilatation of the sheath the basis of a pathogenetic interpretation. The hydropsy of the sheath should be produced by the exaggeration of the intra-cranial pressure. As for the mechanism by which this vaginal effusion would act on the papilla, Manz does not clearly define it. Schmidt is more exact, and says that the fluid forced back from the brain into the vaginal space will spread to the lamina cribrosa, which consequently becomes swollen. It is the swelling of the lamina cribrosa which, in its turn, causes choking of the papilla. Kuhnt also believes in penetration of the fluid into the lamina cribrosa; he simply says that there is a direct soaking of the nerve fibres with the fluid. But no one has found lymphatic canals in the lamina cribrosa. I myself have vainly endeavored to make colored fluids injected into the inter-vaginal space at a constant pressure of 15 centimetres of mercury, prolonged for twelve, and even twenty-four hours, penetrate the lamina cribrosa.

The explanation of Schmidt is not to be accepted. Furthermore, the general explanation of neuritis by intra-cranial pressure and forcing back of the cerebro-spinal fluid into the vaginal space, whatever may be the mechanism, is no more so.

Excess of intra-cranial tension undoubtedly exists under the ordinary conditions in which optic neuritis occurs, which are those of hydrocephalus. But excess of tension by itself does not seem capable of producing neuritis, to judge from the experiments of Deutschmann and my own. Experiments in which only successive injections are made into the brain, without further precautions, cannot be taken into consideration; it is not

considered how difficult it is to obtain a permanent tension by injections of fluid or of coagulable substance. In my experiments, compression was produced by a column of mercury. Two kinds of oscillations of the column—one in phase with the cardiac contractions, the other with the respiratory movements—show that the apparatus is in equilibrium with the intra-cranial tension. It is only in this way that one is sure of acting on the intra-cranial tension. But in my experiments not only no neuritis produced, at least no more than already existed, but I never observed the vascular disturbances noticed by M. Schultze more recently by Schultze, in direct relation with the compression. If dilatation of the retinal vessels is produced in the course of the experiment, it is due to some other influence than that of compression. This dilatation may be lacking under the strongest pressure, and when it exists relaxation of the pressure on the brain does not cause it to disappear.

Furthermore, it is doubtful if in man, as in animals, the intra-cranial tension may be maintained at a higher rate than normal without compromising life. In the rabbit, a pressure of six centimetres can scarcely be passed without producing symptoms. The limit to the dog is about ten centimetres.

Manz commits another error in stating that the increase of tension in man may result not only from exudation of fluid into the intra-cranial fluid, but also from diminution of the capacity of the cranial cavity resulting from the development of a tumor. Diminution of the cranial capacity and excess of tension are no means synonymous. The cerebro-spinal fluid is the regulator of the intra-cranial tension. It is by means of it that the tension is easily equalized when substances are injected into the brain, or when the cranial capacity is diminished by the development of a tumor. In order that excess of tension may occur and be maintained for a certain time, it is necessary that the regulator of this tension be altered. These conditions are realized in hydrocephalus, which, in fact, consists in an increase of the secretion of the cerebro-spinal fluid.

Hydrocephalus is a common, but not constant, cause of optic neuritis. It does not act, however, altogether

excess of tension which it develops, but from the cerebral cedema which it causes, or at least which accompanies it. We do not understand clearly the mechanism of this cedema. It has not been shown that it is due to excessive tension caused by the ventricular effusion; it should be considered that the ventricular effusion itself is only the result of a disturbance of the lymphatic circulation situated in the cerebral substance. This explains why no one has succeeded in producing optic neuritis from experimental pressure on the brain. The excess of tension caused by ventricular effusion can easily be realized in these experiments, but not the cerebral cedema.

To the arguments of Leber, Deutschmann, and myself against the theories of Schmidt-Manz, Dr. Rochon-Duvigneaud gives the more recent negative results of Adamkiewicz, who has vainly endeavored to produce neuritis experimentally, and who has not even succeeded in causing either an increase of tension in the carotid, or in the jugular, from intra-cranial pressure.

How, then, can we reconcile the hypothesis of neuritis from compression of the nerve with the so noticeable preservation of vision which has attracted the attention of all clinicians? In hemorrhages into the sheath, quite the contrary has been observed, as de Wecker has observed; blindness followed, with all the ophthalmoscopic signs. Rheumatic retro-bulbar neuritis, which I have noticed, leads to similar conclusions. The clinical development is in accord with the idea of compression in the sheaths, but it is altogether different from that of neuritis of intra-cranial origin.

The success of the theory of Schmidt-Manz is due to the simplicity of the conception, but only appearances are in favor of it, and it will not bear a deep examination.

Leber has been struck with the difficulty of explaining the inflammatory phenomena which developed in the optic nerve by the purely mechanical theory of Schmidt-Manz. In 1881, at the London Congress, the idea of infection made its appearance. More recently, Deutschmann has given more weight to this

theory in endeavoring to establish it by experiments. can do no better than to quote textually from Dr. Duvigneaud :

“ The theory of Deutschmann, in spite of the success he has had from the intervention of microbes, is also being satisfactory. If, instead of accepting the experiments of Deutschmann, one consider the common etiology of oedemas, their pathological anatomy at the start, and complete disappearance in cases where the cause is removed, becomes very doubtful whether infection can be their originating cause.

“ Deutschmann has provoked an infectious neuritis in the orbit, the development of which is far from being identical with that of papillitis from cerebral tumors, or from meningitis. Atrophy followed in a few weeks, while a human papillitis remains oedematous for months (and even exceptionally for years, as in a case described by D. Webster) before becoming cured.

“ Furthermore, how does it happen that cerebral tumors, which assuredly are not an infectious disease in the same sense as meningitis, almost invariably produce papillitis, while tubercular meningitis is accompanied by it in scarcely half the cases (Parinaud), and papillitis is extremely rare in abscess of the brain? It is said that they are encysted. Not enough, however, to prevent the absorption of their toxins from causing attacks of night fever, as I have observed in the case of an enormous abscess with foetid pus in the occipital lobe without any alteration in the papilla.

“ And what becomes of this theory in cases of papillitis from a lowering tumor or even serous cyst of the orbit ?

“ But we must first examine this question of the non-infectious nature of tumors, and that without presuming on the subject of their etiology, still unknown, and exclusive of the aid of clinical arguments, of which all ophthalmologists readily find examples in their memory.

“ They are less likely than others to misunderstand the fundamental difference which separates properly called tumors

flammatory neoplasms. A sarcoma of the choroid develops in an eye otherwise perfectly healthy, at least until the symptoms of glaucoma appear. An ophthalmologist will never confound a sarcomatous excrescence from the ciliary body projecting into the anterior chamber at the angle of the iris, even though it is entirely red and altogether deprived of melanotic coloring, with a syphilitic gumma or a tubercular mass. In fact, in the first case, that of sarcoma, there is no iritis; the iris is perfectly brilliant and movable, at least, provided that the eye has not reached the glaucomatous period.

"In the case of gumma or of tubercle, on the other hand, besides the localized lesion there are other things: there are iritis, peri-corneal injection, and disturbances of the media.

"The microscope only confirms the extension to the deep membranes of the eye which is shown by the clinical examination. In choroidal sarcomas there is *no reaction at a distance* on the normal membrane beyond those parts in immediate contact with the tumor; it is, in fact, a fleshy excrescence in a healthy eye.

"In tubercles or gummas, on the other hand, even in the case of an isolated tubercle of the ciliary region, the microscope reveals the iris infiltrated with white cells, so that its thickness is doubled, and this cellular infiltration extends to all the membranes of the eye, including the vitreous and the retina at a great distance from the inflammatory nucleus. In fact, everywhere there is a cellular reaction at a distance characterized by a properly called infectious condition (bacterial).

"These facts seem to prove that if meningitis, a bacterial affection, can produce inflammatory reaction at a distance, infect its own neighborhood, and, what concerns us, the papilla, by means of the optic sheaths, the same cannot be the case with cerebral tumors, since choroidal sarcomas produce no reaction of an inflammatory nature in the eye, but only glaucoma, a process which is only inflammatory in appearance.

"If meningitis, a septic disease, can cause papillitis with great frequency, which always accompanies cerebral tumors, non-septic affections, it is not in their infectious nature that

the cause should be sought, but without doubt in so character or consequence proving its common nature. Tumors of the brain and the different affections of the optic nerve producing papillitis.

"Furthermore, Manz, at the Fribourg-en-Brisgau in 1888, replying to a recent article by Deutschmann, already laid stress on the discrepancy between the frequency of papillitis in cerebral tumors, which have meningeal exudate, and their relative rarity in meningitis, in which there is secretion of toxic fluids. And also it is noticed how surprising it is that an infectious agent from the cranial cavity should attack the optic nerve, while intact the other nerves which, more directly than it, are in the infected cerebral spinal fluid.

"Arguments no more speculative, but of truly experimental nature, are supplied against the theory of papillitis from the fact that after the complete recovery, the *restitutio ad integrum* is obtained in papillary œdemas caused by curable gummas, or, in the case of proper tumors, by trepanning.

"Max Perles (*Centralblatt für Augenheilk.*, October 1892) studied six cases of papillary stasis in both eyes from five of which were dependent upon syphilitic cerebral (probably gummas), and the other of unknown origin. In all cases complete recovery was obtained, either by mercury alone or by mixed treatment. Complete recovery from the functional standpoint, and also from the ophthalmoscopic standpoint.

"Prof. Uhthoff (*von Graefe's Archiv*, 1893) also studied papillary stases of specific origin (almost always due to cranial gummas, sometimes to basal gummatous meningitis), which exceptionally to cerebral softening from specific arteritis disappear without leaving a trace under the influence of treatment.

"But it is principally the recoveries from papillitis after trepanning, without the intervention of any medicinal agent, which might act on the papilla, which form the most convincing argument against the theory of infection considered as the unique or principal cause of papillitis.

Shalders Miller (*Brit. Med. Journ.*, July 23, 1892) de-
case of microcephalus in a child of eight months, with
on of the extremities, retraction of the eyeballs, nys-
double papillitis, and blindness, in which he performed
of a small portion of the frontal bone. The enoph-
the nystagmus, and the double papillitis disappeared,
proved, and in a few weeks the child assumed the
ce of a normal baby.

Artoni and Brigatti (*Centrallblatt für Augenheilk.*, 1893)
a case of a girl, seventeen years old, with Jack-
ilepsy on the left side and double papillary stasis.
nning, a fibro-glioma was removed from the cerebral
The papillitis disappeared completely, and a year and
er the operation there was complete recovery.

Bruns (*Centrallblatt für Augenheilk.*, 1893) performed tre-
in a case of cerebral tumor with double papillary stasis.
he could not find the tumor, there was, doubtless on
of the escape of a large amount of cerebral spinal fluid,
vement in the general symptoms and a total disappear-
the double papillitis. Four months later, the patient
three distinct gliomas were found in the temporo-
region.

Other cases could be given. Analogous facts have
lished by Hahn (Berlin Surgical Congress, 1893), by
J. Taylor, Beavor, and Ballance. The majority of
who have thus obtained the disappearance of papillary
ve remarked how contrary these results are to the
Deutschmann.

Simply the opening of the cranium and the escape of
oral spinal fluid (Bruns' case), in some cases drainage of
icles (Hahn's case); in the case of Shalders Miller, pos-
relief of pressure on the cerebral substance, and never
val of the tumor itself, which is the condition of recov-
papillary cedema. Horsley and J. Taylor agree with
ion.

It is, then, probable that even in the case of tubercular
is trepanning will favorably modify papillitis. There

is here some analogy with the improvement which may result from a laparotomy in case of tubercular peritonitis, where nothing else is done than to remove the peritoneal fluid and wash the cavity with boiled water.

"In fact, all goes to prove that there is a very great difference between papillary oedemas, which respect the function for a long time, and which may disappear without leaving a trace after essentially mechanical treatment (drainage by trepanning), and neuritis and papillitis, which are inflammatory, which rarely recover without leaving at least, traces of atrophy, and are accompanied from the beginning with intense visual disturbances.

"The infectious nature, then, of a papillary alteration which disappears by simply opening the cranial cavity is hardly admissible. Deutschmann, however, has obtained something more or less analogous to papillitis by injecting tubercular bacilli into the cranial cavity. But has he shown that the bacilli have reached the sheaths of the nerve and infected the papilla? He demonstrated that the papillitis was the direct result of the infection? By no means! He has caused tubercular neuritis in a rabbit, which was followed, as it might have been in man, by papillary changes. It remains to give a satisfactory interpretation of this fact, and that is where many of us, myself included, disagree with Deutschmann. We do not wish to deny that infectious products secreted into the cranial cavity may have a harmful influence on the papilla if they succeed in reaching the sub-arachnoid space of the optic nerve. It is possible that in certain cases infection may cause an oedema, but this oedema, which can leave the visual function intact for so long a time, and consequently the nerve fibres healthy, is an essential factor, and Deutschmann's theory does not explain it.

I can only give my approbation of Dr. Rochon-Duvivier's criticism. The neuritis which Deutschmann has obtained by injecting infectious products into the cranium is evidently not the same as that which we know. Beyond the direct proofs showing that the neuritis is in no way related to the infectious diseases of the cerebral diseases which cause it, the histological changes

of microbial inflammations, the results of trepan-
are the clinical development, which in itself alone
theory. Whoever has observed a certain num-
of neuritis of intra-cranial origin has been struck
able preservation of the visual function, at least
direct lesion of the expansions of the nerve, con-
the intensity of the ophthalmoscopic symptoms.
other hand, one recognizes the susceptibility of
e fibres, the least changes in which are immedi-
ed by characteristic functional disturbances, it is
accept the idea of an infectious process, which
sly alters the anatomical elements.
ry, which Dr. Rochon-Duvigneaud then criticises,
lesion at first inoffensive, and producing more or
change in the nerve fibres, is, on the other hand,
ord with the clinical development.

ained the production of neuritis in the following

itis of intra-cranial origin is primarily a lymphatic
e nerve. This œdema is produced by the same
l the same mechanism as the œdema in the cere-
e, of which the optic nerve forms a sort of orbital

It is most frequently combined with hydro-
the increase of intra-cranial tension which accom-
t it does not necessarily imply the existence of
ydropsy. Furthermore, the excess of intra-cranial
s. to be incapable alone of producing capillary

the optic nerve does not imply a considerable ex-
cranial tension, or mechanical forcing back of the
fluid into the nerve, any more than œdema of the
ic or abdominal affections implies a strong eleva-
us tension, or forcing of serous fluid into the ex-

vaginal infusion of the optic nerve is a concomi-
enon which has no relation of cause and effect

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with neuritis. The latter would occur quite as well were no inter-vaginal space.

The scleral ring favors the papillary strangulation produced by this oedema in the same sense as a ligature on an extensor limb. On the other hand, the external seat of the nerve plays a protective rôle in relation to the nerve in the same way as a compress bandage does on an oedematous limb.

For these reasons, I have proposed to designate optic neuritis of intra-cranial origin by the name of oedematous neuritis which seems likely to be accepted.

Dr. Rochon-Duvigneaud recognizes that this explanation is less open to criticism than that of Schmidt-Manz, and that it is in accord with the essential clinical characteristics of neuritis. He might also have laid greater stress on its correspondence with the anatomical facts and with certain peculiarities in his own cases, to which he probably does not attach enough importance. I will simply mention here the enormous swelling of the chiasm, the changes in which have been observed by Türck and Böllcher. This swelling is difficult to explain by the theory of Schmidt-Manz, in perfect conformity with my opinion.

Dr. Rochon-Duvigneaud makes the objection that we do not clearly know the passages by which the lymphatic circulation of the nerve connects with that of the cranial cavity. I admit this, although the articles of Key and Retzius seem to demonstrate that this communication is established in large part, if not exclusively, by the nerve itself, and not by means of the inter-vaginal space. But if the exact knowledge of the passages of communication is necessary to establish the Schmidt-Manz theory, it is not necessary in my explanation. It is enough to know that this communication exists, and not to deny it. It is enough to know that the optic nerve is a proper nerve; its mode of development, as well as its structure, makes it a sort of orbital prolongation of the cerebral substance. This is a point which I emphasized in my a-

which Babinski also emphasized in his excellent neuritis.

neuritis is a lymphatic œdema of the nerve, how can the development of histological changes of more or less inflammation which are observed at a certain period be explained? I have stated that these changes were of the same nature as those which develop in œdemas in other parts of the body, which have simply for their cause the presence in the nerve of the serous effusion.

In 1879, our ideas of inflammation have undergone a radical change. Histology can no longer define inflammation, its commencement, or where it ends. But the change in our ideas has in no way changed the facts, which remain the same. It only gives them a new interpretation. The general notion is derived from modern knowledge in reference to inflammation is, that whenever the vitality of tissues is compromised by any cause whatever, this cause is represented by their toxins; by organic poisons, or poisons communicated; by physical agents, or by traumatism, and inflammation is produced tending to the preservation of the anatomical elements, to their reconstruction, or to their removal by others. This new interpretation of inflammation, far from contradicting my opinions of 1879, gives them a more rational and precise sense. Formerly, it was only known how œdema became transformed into inflammation. It is better understood to-day how a serous effusion, remaining in contact with the anatomical elements, being renewed, compromises their vitality and leads to inflammation, which differs in no respect from ordinary chronic inflammation, without the necessity of the intervention of an infectious element. It is only necessary to grant that an effusion which is not renewed becomes a toxic liquid for the anatomical elements. We have a striking example in the effusion of venous blood. I have also noticed that œdemas of venous origin lead more rapidly to inflammatory lesions than those of hemorrhagic origin.

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Then it should be considered that the fluid which ous elements imbibe results from pathological hyper it has not necessarily the constitution of the normal spinal fluid, and it may have irritating properties of nature, which are enough to clearly explain the inflammatory changes, according to Max Perles, who does not ascribe a cedematous nature of neuritis.

Dr. Rochon-Duvigneaud, after showing in his criticism of Deutschmann's ideas how slight a foundation there is for the infectious origin of the inflammatory changes, accepts the theory of a purely cedematous origin for these changes. He shows that without departing from the domain of ophthalmology, one can find an affection with which microbes have nothing to do, and which terminates by sclerosing lesions—that is, coma.

If histology is not capable in itself of defining the exact nature of the intimate nature of the different processes which are due to inflammation, the information which it gives us is less valuable, and the two cases of Dr. Rochon-Duvigneaud form, for the subject in question, important evidence.

The histological lesions in these two cases are not of inflammatory character. The author emphasizes this several times. "The considerable proliferation of cells in No. 1," he says, "analogous to that which is seen in every optic nerve with simple atrophy, seems to me of explanation otherwise than by symptoms of inflammation. But as for No. 2, it must be granted that this is a proliferation of neuroglia cells such as could be produced by so-called inflammatory causes. . . . But this was a special inflammation, since the connective tissue stroma of the nerve was healthy, had no oedema, no leucocytic infiltration, and the contents of the vessels were normal."

The method of repairing the changes in the different conditions of the nerve also deserves attention. Like the pathologist who preceded him, Dr. Rochon-Duvigneaud emphasizes this singular peculiarity, that the lesions predominate

in the intra-cranial portions of the nerve, while less pronounced in the orbital portion. In certain cases have been scarcely perceptible in this portion of the optic chiasm and the optic tracts were also involved, as in the case of Türk, etc.

I have admitted an ascending alteration, in conformity with the theory of Schmidt-Manz, according to which the internal effusion arises primarily from the ocular extremity of the nerve. While he does not admit the theory of Schmidt-Manz, Dr. Rochon-Duvigneaud believes, as his predecessor, in an ascending alteration of the nerve. I cannot follow him. An ascending process does not explain the integrity of the orbital portion of the optic nerve any more than a descending process does. All the peculiarities of the disposition of the lesions are explained, on the contrary, very clearly by my theory. If it is granted that the pathological changes are determined by the œdema, it will be seen that they predominate where the œdema is the most pronounced. But I have already stated that the scleral sheath, in relation to the nerve, the same rôle as a ligature of a bony limb; it is for this reason that the lesions are more marked in so marked a manner in the papilla. I have shown that the internal sheath of the optic nerve plays the same active rôle as a compress bandage on an œdematous limb to prevent or diminish the production of œdema. It is for this reason that the lesions are less pronounced in the orbital portion of the optic nerve. These lesions develop anew in the orbital portion, where the nerve has not the same protection. They are also found in the chiasm and the tract, because the œdema is not limited to the nerve; œdema of the meninges is cerebral œdema. I am certain that when the opportunity is taken to investigate the lesion in other places than in the optic nerve and its expansions—for example, in the auditory nerve, it will be found there, on considering the mechanical changes which, in the optic nerve, favor strangulation and consequent pathological changes.

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The results obtained recently by trepanning also rate my theory. Several surgeons have noticed that the diminution or disappearance of capillary oedema is necessary to remove the tumors, but simply to produce of the cerebral spinal fluid. That tumors, in fact, do produce neuritis by pressure or diminution of intra-cranial city is a fact which I have emphasized. As in meningeal tumors require an intermediary, which is hydrocephalus or rather cerebral oedema. It can also be understood that trepanning is without effect in certain cases when atrophy of the brain follows a purely cedemateous alteration.

For sixteen years, since my second memoir appeared, I have written nothing on this subject. I have not replied to the criticisms which my opinions evoked, although I was more certain of their correctness. I think, indeed, that criticisms are useless in science, and that the truth will appear or later in spite of criticisms, and in spite of calculated attacks. Our ideas, however, are only admitted when they have been controlled by and received the sanction of others. As Dr. Rochon-Duvigneaud does not accept mine without restrictions, I hope that his article, published in full, will be considered as a plea in their favor, which does not aim to extol it as much as it merits.

SEVERAL CONSIDERATIONS ON THE APPLICATION OF ELECTROLYSIS IN TWELVE CASES OF DETACHMENT OF THE RETINA

By Dr. **TERSON** (Toulouse).

Although great progress has been accomplished in ophthalmology from the simultaneous perfection of our methods of observation and our instruments, the treatment of detachment of the retina has remained, until lately, one of the most difficult points in ocular therapeutics.

Whatever opinion may be held as to the pathogenesis

grave affection, its causes, and the peculiarities which it presents, two facts predominate : the detachment of the retina from its normal anatomical position, indispensable to its function, and the interposition of a fluid between the retina and the choroid, preventing, by its simple presence, the re-attachment of the nervous membrane.

There are, then, two objects to be sought in the treatment of detachment of the retina : the evacuation of all or part of the sub-retinal fluid, and of this fluid alone, and an endeavor by the best means to facilitate the re-application of the retina in its normal position after the fluid has been evacuated. It is, of course, understood that this double result should be attained with the minimum damage to the media and to the deep membranes of the eye. Otherwise, as one of our colleagues has said, possibly a little too severe on such a difficult subject, the re-attachment will only be an objective satisfaction for the operator. Also, the re-application of the retina, or at least the arrest of the disease, should be brought about a sufficient time after intervention to be able to pronounce a recovery, or to recognize a decided improvement.

Such are the fundamental principles which should guide our treatment, and from which we cannot escape without serious criticism.

Such were doubtless the ideas which guided our predecessors and some of our colleagues in the use of operative methods or various combined methods, which are known to all of us, and which I will simply enumerate here. From the surgical standpoint are simple puncture and aspiration, drainage, double laceration of the detached retina, iridectomy, penetrating or non-penetrating cautery points, and medicinal injections in the eye after puncture. All have been tried, even to attempting to suture the retina to the sclera. From the medical standpoint: prolonged rest in the dorsal position, compress bandages, injections of pilocarpine, mercurial preparations, and antiphlogistics of all kinds.

Nevertheless, none of these operative methods, and none of the medical methods destined to aid surgical action, have enabled

one to say that a detachment of the retina, even a re-
has been cured, or, indeed, effectually arrested in its
What are the causes of this ill success, which is so
that it may be considered as almost the rule (de Wee

Should they be sought in our incomplete knowledge
pathogenesis of detachment of the retina? From
discussions, almost every one admits that there are
two great divisions of detachments: the exudative
sulting from a choroidal affection, and that which b
principal cause retraction of the vitreous humor, v
contracted an abnormal adhesion with the retina.
this attraction and this retraction of the vitreous whic
the retina from its natural support be remedied?

Furthermore, it has been found that in a great n
cases there is a rupture of the retina coincident wi
tachment, whence results a direct communication be
vitreous and the sub-retinal fluid. From all evidence
dition can only be harmful to direct intervention;
puncture which permits a somewhat prolonged fil
the intra-ocular fluids is a real source of danger, bec
the extravasated fluid some of the vitreous will escape
prolapse can only have an evil and disastrous effect.

All detachments, however, are not accompanied
ture; at least, I have frequently sought it in vain.
all are not accompanied, at least at the onset, with p
fibrinous retraction of the vitreous.

Do we not see cases in which cicatricial traces
retinitis appear where were formerly swellings of t
without the perfectly transparent vitreous showing
of retraction? Do we not sometimes see cicatrici
short distances from each other, and retinal folds, pr
an old process and the present existence of exuda
ings? There are, then, in the pathogenesis of detachm
ous elements, combined in various degrees accordi
case, and features revealed by ophthalmoscopic
tions which still more complicate the difficulties,
standpoint of direct intervention. Are these reasons

to reject all intervention by considering the disease
le? I do not think so, for we have all seen cases
e recovery, with at least partial re-establishment of
m reabsorption of the effusion which keeps the
n its normal position. We should, then, as it has
endeavor to bring about a process similar to that
n natural recovery; but we should redouble our
and endeavor to measure our action in the most pre-
er by avoiding any possible communication, even a
e, of the vitreous humor with the sub-retinal fluid,
be evacuated.

ysis, already recommended by Abadie and Schoeler,
e to be the method most capable of responding to
ties of the problem to be solved.

all acquainted with the application of chemical
ustics in the treatment of effusions of various kinds
(aneurism, and *nævi*), by the introduction into the
needles attached to the poles of a battery of constant
Some introduce the needles attached to both poles
usly, and have recommended *bi-polar* electrolysis;
roducing one or the other of the two poles into the
issue, have performed *positive* or *negative* electrolysis
g a plaque attached to the non-utilized pole at some
o complete the circuit.

g to the various authors, electrolysis acts both by
e absorbent properties of the vessels in the neigh-
the effusions and by modifying the composition of
contents. It has, at any rate, a most powerful coagu-
et, especially if the positive pole, which represents
on with acids, is applied at the diseased point. This
g effect is very weak if the negative pole is directly
d, an important fact in the case which interests us,
f puncture does not close well after the operation.
ive electrolysis has been chosen for the treatment of
with the purpose of avoiding secondary hemor-
d of obtaining the most active coagulating effect.
efore, the positive pole which should be introduced

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into the eye in the treatment of detachment of the retina. In some cases it is necessary to obtain closure of the wound as rapidly as possible, through fear of causing a dangerous hypotonia. A very small wound should be made, and, consequently, very fine needles must be employed. But here a difficulty presents itself. It is not to have electrodes made of one or two metals which are not affected by the products of electrolysis. Steel is not in this class, and is therefore useless. Gold and platinum do not possess the necessary rigidity to penetrate the sclera. It is difficult in eyes with sub-normal tension. We are only now using platiniridium, so useful, from the antiseptic standpoint, for the canulas of our injection syringes. But it must be noted that the metal obtained by this amalgamation has not the perfect polish of our other instruments, which facilitates penetration.

Abadie and Schoeler have employed very small knives, but this is dangerous. My colleague will doubtless tell me whether he has or has not modified the technique of his operation which he described to the Ophthalmological Society of Paris, at the session of June 6, 1893. Van Moll has employed negative electrolysis, but without success.

The technique of Schoeler's operation is also known. It consisted in the use of bi-polar electrolysis, applied to the detachment in accordance with the principle formerly applied in the treatment of hydrocele. This practice seems to me a harmful one, on account of the necessity of making multiple punctures in the eye, one of which is made with the electrode, which I cannot commend.

I have endeavored to imitate the operative method employed by Gillet de Grandmont, with which our regretted colleague was very successful (1). I have employed, as he did, a needle made of platiniridium. This needle is mounted on a small metallic shaft, furnished with a groove to facilitate the handle of gutta-percha, which, as in the instrument of

(1) GILLET DE GRANDMONT : Extensive Detachment of the Retina ; Recovery. (*Arch. d'opht.*, June, 1894.)

adie, serves as a handle, and also as an isolator, to the action of the current in the platinum point. I tested positive electrolysis, as Abadie and Gillet de Grandmont have done, by applying a current of 5 milliampères for a period of one minute (1). Adadie, as is known, used a current of 2 to 3 milliampères for five minutes. The method which I have made in Abadie's technique, from the standpoint of length of application seems to me to be important both for the patient and for the operator. A decided pressure cannot be maintained for five long minutes on an eye with subsidence without inconvenience and without the instrument slipping off. In my first operations, it seemed to me that Gillet de Grandmont's apparatus was too small, and that the eye with too much difficulty, in spite of the rosette movement recommended by the author. I requested M. Gillet de Grandmont to make needles for me on various models, some of them very fine, some with a triangular point, others with a rounded point, fitting in a special needle-carrier surmounted with a gutta-percha handle, which isolates the extremity of the needle, and enables one to use a current of 3, 4, or 5 milliampères, at will. This instrument is as easy to manage as

which has shown that too fine needles bend at the surface of the sclera instead of penetrating the eye. Those in which the point is made in the form of a trocar penetrate very easily. An accident which occurred following an operation performed (Case XII.) has caused me to reject triangular needles through the fear that the form of the wound will facilitate an exaggerated filtration of intra-ocular fluid. I now use a very narrow, lance-shaped point, like Bowman's

I request, Drs. Clavelier, chief of the ophthalmological clinic of the Faculté, and Maraval, one of my former internes, undertook a series of experiments on rabbits, with the object of discovering the effects of currents of different intensity and different duration on the vitreous humor. Later will be given a summary of these experiments, which have proven the innocuousness of a current of 5 milliampères for one minute.

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discission needle, penetrates very well, but is hardly better than Gillet de Grandmont's needle. In fact, this is a difficulty to be overcome, and I hope to be able to perfect the needle still more, if it is possible.

An important point in performing the operation with precision which it requires consists in measuring the strength of the current with a very sensitive galvanometer without any troublesome oscillation. The apparatus which Chardin has furnished me is very handy and accurate. I am now able to give a current of 5 milliampères, which is constant during its application. Since July 26, 1888, I have operated in this way on seventeen cases of detachment of the retina, out of nearly 1,700 patients who have come under my observation. Of these seventeen patients, four were operated upon too recently (one three weeks ago) to furnish favorable results. One patient should be withdrawn from these statistics although the word statistics is hardly applicable here. She was a very nervous person, who at the first operation was so frightened that she came back suddenly, when she felt the passage of the current. This caused the needle, which had already been introduced, to be withdrawn from the eye. When the needle was introduced a second time into the eye the galvanometer did not register the passage of the current, and on examination I found that the needle was broken at the end. The patient had no pain, but refused another operation. This demonstrated the inconvenience of very fine needles.

Of the 12 remaining cases, 9 had already lost one eye from detachment of the retina with posterior synechiæ and opacities of the lens. In these patients the detachment in the remaining eye had lasted for from two to eight weeks, except in two of them, in whom it had existed for three years. Of the 9 operated upon for comparatively recent detachment of the retina, there were three temporary improvements (Cases III., V., and VI.), and five more lasting improvements (Cases II., IV., VII., VIII., and IX.), in two of which a second operation enabled the patients to walk about unaided in the day-time. But a certain

ent remained in these patients (1). In the ninth which one eye had already been lost and the detachment of the other eye was far advanced and had lasted from many years, the operation, although very carefully conducted, followed by unexpected complications, which I attributed to the use of a triangular needle (Case XII.). The chamber, on the next day, was very deep, and there was an irido-choroiditis. It is probable that the liquefied vitreous had in part filtered through the wound after the operation. This case shows that old detachments should be treated by themselves, however unfortunate such a confession may be to the patient and the physician. In the three cases in which only one eye was attacked, I obtained a temporary cure. In a young woman in whom the detachment was first noticed, it occurred in an eye which was already the seat of extensive atrophic lesions of the macula.

In another patient (Case X.), electrolysis in no way affected the detachment, which was almost complete, and which had lasted three months, with vision below $\frac{1}{10}$.

In the case, in which the detachment had only lasted eight days, and a success, the more remarkable in that the eye was nearly entirely lost. This case merits being described as the most interesting.

Marie O——, thirty-four years of age, seamstress at Castelnau (Garonne), came to the ophthalmological clinic of the Hôpital de Toulouse on August 6, 1894, stating that eight days before she had lost the sight of her right eye. She had at first noticed a redness which prevented vision on the nasal side, and then in a few days the curtain advanced to the middle of the eye, and little by little covered the entire eye, so that on the next day she could only see light from darkness. It was in this condition that I saw her. She had always been extremely myopic, and had always seen less with the right eye than with the left, of which she did not complain. On examination, I noticed that the anterior chamber was of abnormal depth, the pupil reflex was very weak, and the iris trembled slightly.

It is useful, in very extensive detachments, to employ electrolysis with the needle attached to the positive pole and introduced simultaneously at a short distance from each other, as in naevi of some size.

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The fundus of the eye had a dirty, yellowish appearance seen at the commencement of infection. The tension was diminished. On ophthalmoscopic examination, I found a sac-shaped detachment, which included more than a third of the retina. The disc was scarcely distinguishable, on account of the generalized cloudiness of the vitreous humor. The left eye was 7 dioptres with weak vision.

Although considering this condition as desperate, I immediately submitted the patient to electrolysis, and applied a current of 10 milliamperes for one minute. I mentioned to the people the great difficulty in causing the needle to penetrate the sclera on account of the hypotonia, which caused it in a way to yield to pressure, and caused serious apprehension as to the result of the operation performed under such adverse conditions. No complications occurred. Forty-eight hours after, I had the patient get up and had an ophthalmoscopic examination. The removal of the bandage was a revelation. The vitreous, which had regained its transparency, enabled me to see atrophic disseminated choroidal plaques and a macular lesion. There was no longer a trace of detachment of the retina. The anterior chamber had become more shallow, and the pupil reflex was normal.

Wishing to follow the experiment to the end, I did not resort to any further treatment. On the sixth day there was no trace of detachment. The external appearance of the eye was the same as that of the healthy eye. Vision was $\frac{1}{10}$, with - 12 dioptres, and the visual field normal.

The patient left the hospital on the fourteenth day. She remained in bed in all four days, and had only returned to her accustomed hour as repairs were being made in the ward. No special treatment has since been employed. I saw the patient again two weeks afterward, and nothing had changed. On March 25, the vision remained $\frac{1}{10}$, and the visual field, which I examined myself with the greatest care, had remained normal.

Nothing is lacking, I think, in this case to give it the interest, and to render it impossible not to attribute the result to my intervention. The case was desperate, and the treatment was employed, not even rest in bed in the usual position. It should, however, be borne in mind that the detachment was quite recent (eight days). I also desire to stress upon the great improvement in the general nu

which enabled the vitreous to regain almost complete density in forty-eight hours, and the anterior chamber to its normal depth. Electrolysis might, then, be studied from the point of view of its application to deep affections of the eye similar to this, less the detachment, and possibly to those in which there are signs of imminent detachment. It is particularly in a large populous centre such as Paris that it is frequently possible to see ocular accidents at the moment of their production, and often even before their complete development. In the provinces, we unfortunately see the manifestations of detachment of the retina too late, for the patient is ignorant of the gravity of the disease at a time when intervention might produce a good result.

IX.—Paulin C——, fifty-nine years of age, entered the hospital July 20, 1894. OS: lost from old detachment and total posterior nechia. OD: detachment of six weeks' duration, occupying the upper external portion of the retina and forming a large pouch. V = $\frac{1}{10}$ with much reduced visual field. The patient cannot walk unaided.

July 26, Gillet de Grandmont's needle, attached to the positive pole of a battery, was introduced into the eye for a distance of 4 to 5 centimetres. As it was my first operation, and as I only had at my disposal a galvanometer which made very troublesome oscillations, I gave approximately a current of $2\frac{1}{2}$ to 3 milliampères for one minute. There was no pain. Some resistance was found on withdrawing the needle, on account of the production of a small dry membrane. A constant occurrence in operations where positive electrolysis

was used. The bandage was removed on the third day. Vision had increased. A hypermetropia of 1.75 dioptries was found. With a 3-dioptre convex lens the patient could read No. 5 of de Wecker's scale. The visual field was considerably enlarged. The patient was with difficulty supported for a week. He went out on the fifteenth day, and walked about unaided. There was most evident improvement. Three months after, the patient returned. There was a central scotoma and an extensive inferior detachment. This time I used a current of 5 milliampères for one minute. There was no reaction or complication. Again there was improvement, but folds were still seen in the lower portion of the retina.

Information which I received a few days ago (nine months after the operation) assured me that the patient could walk unaided, at least in the day-time. He has had no other trouble. It may be stated that this good result was due to electro-

Case III.—Jean C—, fifty-two years of age, had very myopic. OD was lost some time ago from detached circular posterior staphyloma with atrophic macular choroid. Slight but almost complete swelling of the retina, occurred five days ago. The visual field was practically *nil*, and could not walk alone.

July 31, current of 6 milliampères was given for one pain. Rest in bed. Patient very restless.

August 2, the patient saw much better. The retina re-attached at all points except below, where there were scarcely perceptible folds. There were some flocculi in

On August 10 the patient was well satisfied, and turning home. He could not bear lying in bed, and useless, since he saw as well as before the accident. time (after nine months) I learn that the patient is fairly well in the day-time, but he has pronounced the case in the majority of cases with detachment of is, however, a fairly good result, if the extreme grade at the time of intervention, the former lesions, and other treatment are considered.

Case IV.—Sophie J—, forty-three years old. detachment and irido-choroiditis. OS: slightly elevation of the upper external portion of the retina, of the retina. A slight discoloration of the disc of unknown origin. There had been no syphilis. The patient was very weak and could scarcely see to walk.

July 25, current of 5 milliampères for one minute.
August 1, the patient noticed a marked improvement in his condition, and could walk about with ease.

August 9, she left the hospital. V = $\frac{1}{4}$ with 20° visual field was increased, but had not regained September 24, the patient had a relapse. This ment occupied the lower portion of the retina. V A second application of electrolysis of 5 milliamper Vision again improved, but recovery was incompl away on the fifteenth day.

This patient can now go about alone and perform his duties.

, which must be attributed to the two applications of electrolysis, should be considered a success by reason of the serious atrophy of the disc with the retinal

Joseph L——, sixty-four years of age, from Toulouse, came to the clinic of the Hôtel-Dieu on June 20, 1894. OS lost vision and irido-choroiditis. OD: detachment of one eye, including almost the entire upper portion of the retina. There was also a very distinct rupture. Refraction was

not submitted, with no success, to treatment of dorsal electrolysis (six weeks), mercurial friction, and injections of pilocarpine.

Detachment had lasted forty-five days, when, on August 4, electrolysis was performed for the first time.

On the third day the patient noticed a great improvement in vision, and the vision of the visual field was satisfactory. Several folds, which had been seen in the formerly detached portion of the retina,

disappeared after six weeks, and a second intervention produced a permanent improvement, so that when the patient left he could see with ease.

Result was not permanent, and the patient returned after a few days stating that his vision had slowly declined. Several months later he could scarcely find his way to come to the clinic. There was no improvement in this case only a temporary improvement.

Felice B——, eighteen years old. OS lost some time vision and irido-choroiditis and detachment. OD vision had rapidly declined for a month. Lower external detachment. Staphyloma of the cornea free of myopia. The patient could not walk alone. She came to the hospital and was operated upon November 9. A current of 10 milliamperes for one minute with a triangular needle, was used without great difficulty.

After removing the bandage, on the third day, the detachment had disappeared. The patient, of her own accord, stated that she could see persons about her, while before she could only see at one

point. The visual field had, in fact, almost regained its normal extent. On the following days, and I thought that I had secured a second complete recovery, when, on the thirteenth day, for an unknown cause, the patient saw a shadow appear on the

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nasal side, and I found a slight detachment in the temporal V = $\frac{1}{16}$ with - 12 dioptries.

This young woman returned home and remained in weeks, employing mercurial frictions of 2 grammes daily still go about alone, but not after sunset. I think that if had been operated upon at the beginning of the detachment greater precautions could have been taken after the complete recovery would have been obtained. This case entitles to perform electrolysis, *combined with all the methods useful.*

Case VII.—Victor J——, forty-five years old, from C

OD: Extensive central corneal opacity dating from He could not see with this eye to walk about.

OS: Detachment limited to the lower internal retina of three weeks' duration. Visual field much ward and outward. V = $\frac{1}{16}$. Entered the hospital operated upon January 14, 1895. Current of 5 milliamperes minute. A swelling of the conjunctiva was seen and was withdrawn. No reaction. On the third day, On the tenth day, a second operation, which produced improvement. V = $\frac{1}{4}$. Visual field enlarged.

It has been impossible to obtain further information by all my efforts, and I have classed this patient in the category of temporary improvements—that is to say, negative results.

Case VIII.—Apollonie S——, twenty-five years of age, from the house.

OS lost from myopic detachment.

OD: Extensive detachment of eight days' duration at the disc and included the entire upper external retina. There was also seen in the highest part of the detachment a large rupture, with protrusion. The patient could not walk alone.

Electrolysis was performed on February 9, 1895. 4½ milliamperes for one minute. Ophthalmoscopy made only on the eighth day showed that the detachment, and the rupture could also be seen. The patient, however, much improved. There was myopia of 12 dioptries. The visual field was almost normal. The patient remained for three weeks, and was given regularly inunctions of Neapolitan ointment.

I saw this young woman again, and she had

work, and recently came to the hospital alone, very much satisfied with her present condition.

This result may be considered as in a large part due to the use of electrolysis, for it was by its means that immediate improvement was brought about.

Case IX.—Blanche L——, sixty-four years old. OS lost some time ago from phlegmon. OD detachment of three weeks' duration, extending to the disc. High degree of myopia. Visual field much reduced. The patient, who could no longer go about alone, was operated upon February 21, 1895. On removing the bandage, on the third day, the patient noticed a great improvement in vision. Ophthalmoscopic examination made on the eighth day revealed a large plaque of atrophic choroid to the outer side of the macula, and a large posterior staphyloma. The detachment persisted in part, but the patient could go about alone with ease. The visual field was much increased. On leaving the hospital, on the fifteenth day, I prescribed inunctions of 2 grammes of Neapolitan ointment.

From information recently received from the patient, I can state that the improvement still persists.

If the gravity of the lesions is considered, this is still another success for electrolysis, even in absence of recovery, which would have been impossible in such a case.

The following cases are from my private practice:

Case X.—Mme. Ch——, thirty-eight years old, came for consultation October 1, 1894. Both eyes were highly myopic, and she had lost the sight of the left eye three months before in the space of a few days. I found, on ophthalmoscopic examination, a generalized detachment of the retina. M—12 dioptries, with vision less than $\frac{1}{10}$.

Electrolysis with a current of 5 milliampères of one minute duration was given with almost no result, since vision only increased to $\frac{1}{10}$.

This case, as well as the fifth and the one which follows, proved the difficulty of obtaining improvement of any value or duration in detachments which had existed for more than two months.

Case XI.—Mlle. L——, twenty-seven years old, came for consultation in October, 1894, for her right eye, which was highly myopic, and with which she had never been able to read even at very near points. She had suddenly discovered a month before, that there was scarcely perception of light in the greater part of the visual field.

I found on ophthalmoscopic examination a large central plaque

of atrophic choroid, resembling a coloboma of the ch macular regions, and an extensive lower external detach retina.

Electrolysis at first produced such an improvement tha after she returned home, wrote to me expressing enthus appreciation of what I had done to restore her lost visio months afterward a second letter informed me that the had not persisted. It should be stated that so grav irremediable congenital lesion should have no place i show the precise value of an operative method. I ha to avoid the criticism of partiality or inexactness.

Case XII.—Mlle. P——, twenty-four years old, f had myopic detachment of the retina of both eyes, wh for three years. In spite of all methods of treatment consulting me and visiting several of my most emin Paris, the right eye was completely lost, and vision in so weak that the patient could no longer walk about her rooms. She came with her mother to tell me of condition. Encouraged by the results which I had electrolysis in very severe cases, and not taking into suffi tion the long duration of the disease, I proposed thi if the disease had been left to follow its natural would have been totally lost in a short time. I state I could promise no results.

The operation was performed in November, 18 slightest incident, with a needle with triangular current of 5 milliampères for one minute. The withdrawing the needle that she had felt no pain cation. Several hours after, however, there was s the next day, on removing the bandage, it was fou decided generalized sub-conjunctival injection. anterior chamber was more than double, and the pa could not see as much as before the operation. Li choroiditis brought about almost complete loss of vision.

How may this unfortunate accident be explaine that the sub-retinal fluid, which was very abund cated freely with the retracted vitreous, had escape ing, and that violent inflammatory reaction had the great diminution of intra-ocular tension. W due to the special form of the wound produced by a which permitted exaggerated filtration after the

of the long duration of the disease, on account of the
tion of the vitreous? I do not know. In any case, I
retted my interference in this case, and must say that
treat a detachment directly which has existed for more
three months.

usion, of 12 cases of detachment of the retina op-
n by electrolysis, all very serious, and some truly
I have had 1 recovery, which has lasted for nine
d can only be attributed to the operation; 5 im-
t, which have persisted in an encouraging way after
three, and two months; 2 negative results, and 1
n in a case of very old detachment.

Action of Electrolysis on the Vitreous Humor, by
Delvès, Chief of the Ophthalmological Clinic of the
and Maraval, former Hospital Interne.

periments performed in studying this question were
the eyes of rabbits.

used Gillett de Grandmont's apparatus (modified
erson), fitted with steel needles, and have always
ve electrolysis. The needle was introduced to vari-
from 1 to 3.5 millimetres. Every time the chemical
re such that the needle was oxidized on removal
re. The negative pole was made of a metallic plate
th chamois skin soaked in salt water and placed in
's ear. The source of electricity was a battery of
ulphate of mercury cells. The intensity of the
as measured by a Chardin aperiodic galvanometer,
stered to a quarter of a milliampère.

September 29. OD. Current of 5 milliampères for
No noticeable reaction. On the following days, no

24. OD. Current of 6.5 milliampères for one minute.
disturbance of the vitreous, which disappeared in two

ent of 2 milliampères for two minutes. No result.

26. OD. Current of 15 milliampères for one minute.
y diffuse disturbance in the vitreous. Ophthalmoscopic
was impossible. The disturbance still persisted fifteen
ard. The animal saw nothing with this eye.

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In the other patient (Case X.), electrolysis in no way affected the detachment, which was almost complete, and which had lasted for three months, with vision below $\frac{1}{16}$.

In the third case, in which the detachment had only lasted eight months, and proved a success, the more remarkable in that the eye was entirely lost. This case merits being described as it is most interesting.

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well known: granular conjunctivitis. I have kept place of honor because in following the cases of granular conjunctivitis admitted to our hospital I have discovered two facts expected as important, which I consider the most important I have obtained in my seven years of practice.

Granular conjunctivitis loses all its contagious character at Pen-Bron.

In spite of the complete absence of any particular precautions in spite of the fact of living together day and night in the same hospital, in spite of the relative uncleanness of children with granular conjunctivitis, numerous to be properly cared for, a case of contamination has never occurred.

Greatly struck with the paradoxical benignity of granular conjunctivitis which had three times forced me to empty the room of the hospital at Nantes to combat veritable epidemics, I decided to make a deliberate proof of it. I caused to be admitted to Pen-Bron a young girl, Marie Chiff——, decidedly scrofulous, furthermore, afflicted with granular conjunctivitis, who withstood all treatment for more than a year, and who was the worst case I had ever seen.

Marie Chiff—— remained one year at Pen-Bron, lived in common life with the other patients, under the most favorable conditions for disseminating her trouble, and not only recovered completely by a treatment far more simple than which had formerly produced no result, but no other granulations, nor even simple conjunctival catarrhs.

It must, then, be admitted that there is a genuine transmission of the virus by the air.

My idea of granular conjunctivitis is that it is an adenopathic form of tuberculosis developing in lymphatic or circulatory subjects, which is to the lymph follicles of the conjunctiva what the adenopathies are to the lymph glands. The absence of the bacillus of Koch is no argument; it has not been proved that this element is constant in benign forms of tuberculosis which is more complex than is generally supposed.

For years I have advocated this doctrine, and I have sent out patients with granulations to my pupils as candid

I have had a sad confirmation of this in the loss of colleagues at Pen-Bron, in whom granular conjunctivitis was the first sign of the disease which caused his death a few weeks ago.

That granulations are only transmitted in predisposed epidemics in families and the occurrence of catarrhal conjunctivitis in factories, schools, and

I will say that the inhabitants of Pen-Bron were not, but the granulations do not even propagate the disease which accompanies granulations as bronchitis does pulmonary tuberculosis. The cases of simple conjunctival catarrh among new arrivals disappear almost immediately; the disease loses its virulent qualities, and any other explanation would be to be inadmissible.

The experience of my friend and colleague, Jean Kerguistel, of the proper medical service, and whose opinion is always to be considered, confirms this theory in all its points. He has noticed that during the winter the children do not take any case of influenza occurred, although there were many in the neighboring villages of Croisic and Turballe; and children brought from Rennes with measles had only contracted a few children, and that with very light attack; and attacks of whooping-cough are always slight and

Pen-Bron is a new territory, without the germs which exist in the surroundings. The management and architectural arrangements of the new hospital conform to the most exact scientific principles, aiding the action of the sea air, which is not in any way a focus of infection may even occur on board

A quite curious fact is the extreme rarity of spontaneous manifestations. It is quite exceptional to see pustular conjunctivitis in children who in other surroundings would be very subject to it, and who had it before. I attribute this immunity to the absence in the air of fine sand or dust, and that our city districts produce veritable traumatisms and

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slight ebrasures which serve as ports of entry, more particularly in lymphatic children with delicate skin.

SLIGHT EFFECTS OF TENOTOMIES OF THE MUSCLES, AND WHAT ARE THE INDICATIONS AND ADVANTAGES OF TENDON COCTIONS ? (1)

By Dr. **GEORGE T. STEVENS.**

I.—TECHNIQUE OF TENOTOMIES.

I have placed my views so clearly on record respecting the general technique of tenotomies that it does not seem to repeat what I have said.

On the subjects of the papers which have just been read there remain, therefore, for discussion, these two questions:

1st. "*Why are slight effects produced as the result of tenotomies of the ocular muscles?*" and

2d. "*What are the indications and advantages of shortening?*"

In regard to the first question, the slight effects resulting from free tenotomies, I shall venture to say that a tenotomy uniformly produces all the effect that we have a right to expect from it. If we hope to produce a definite effect by operating on a muscle which is not the one in the condition for which we operate, we must expect disappointment. In other words, we shall not get the effect for which we hope if we operate on the wrong muscle.

It is necessary always to take into consideration all the conditions, which enter into the anomaly for which the operation is to be done. All cases of esophthalmia, for example, do not of necessity depend upon any anomaly of the external and internal recti muscles. We may not have, and indeed we do have, many cases of deviation of the visual lines inward which are due to a

(1) Remarks in the discussion of the four papers preceding, on the same subject, (see the report of the proceedings in this number of *Annales d'Oculistique*) at the meeting of the Ophthalmological Section of the American Medical Association, New York, 8, 1895.

false relation of the lateral muscles, but upon too much of the vertically acting muscles. In such a case almost remove the internal recti and still have to the condition of esophoria. As to exophoria, I suspect an essential and original condition, it is of much less occurrence than is generally supposed. Indeed, to an extent not to the full extent, I may express my present opinion on the subject by repeating what I said in a paper on exophoria, 1889 (*Archives of Ophthalmology*, XVIII., 4, 373), in which I called attention to the fact that free tenotomies of the external recti often produce less pronounced effects than might be expected. I then gave as a reason "*That exophoria is not the expression of hyperphoria is a fact that cannot be overlooked by the careful observer.*" In the same paper, a thought which had more strongly impressed upon my mind than I was then ready to fully state, is stated as follows:

"The relative physiological power of the externi and internal recti, when considered, we may well question whether exophoria is a congenital defect." I did not then think that the facts warranted any assertion, nor am I at present absolutely to exclude exophoria from congenital conditions, but I feel warranted in saying that it is in every case a congenital condition, although carelessness of observation may at length lead us to adopt the view that it is an original and essential anomaly (1).

Shown in papers which have been published from time to time, during several years, how converging strabismus may be relieved by proper relaxations of the overacting external recti, and one who gives the subject careful attention may be surprised to find how large a number of squint-eyes, squint in or out, not because of an excessive or of deficient normal tension of the lateral muscles.

Here the photographs of two patients, each with

just now under observation, and which is not unlike a large class of cases, there exists exotropia of 12° , while the tropometre shows the nasal deviation of the eyes to be quite in excess of the temporal rotations. To one who has observed how even moderate tenotomies of the externi restrict the deviation, this condition is extremely suggestive.

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marked converging strabismus; also a photograph of these patients in which it is plain to see that, other anomalous condition may exist, or whether the worst way has been adopted, neither of which questions raised in this connection, a notable change has occurred in regard to the converging squint. In fact, it has been cured and yet in neither of these cases has there been the interference with the lateral muscles, but in each case has been a relaxation of both superior recti (see *Annales Oculistiques*, June, 1894, p. 392).

Now, let us suppose that in either of these cases a tenotomy of the internus had been done (as had been strongly recommended by distinguished surgeons in both cases), is it not plain that a preventive injury would have been done? But is it not also plain that this is the bearing of these cases upon this question of tenotomies and small results, that if these eyes were allowed to swing in by virtue of the action of the vertically acting muscles no tenotomy of an internus short of turning the eyes distinctly outward would have served to prevent the inward squint? After such a so-called "correction" of the eyes very naturally, the gradual divergence so often observed after squint operations.

But there is in all this an element of great importance which has been generally overlooked, although I have called attention to it more than once. This free tenotomy of the internus caused so little apparent change in the appearance of the eyes when directed straight forward has caused a marked and generally an unfortunate, disability of the eye to rotate outward after resection of the free tenotomy.

Time in this discussion will not permit me to go further into detail in regard to these conditions, but I may in a few words call your attention to some important truths.

An unfavorable direction of the eyes with regard to the horizontal plane, in which, by virtue of a preponderating action of the upward or of the downward drawing muscles of both eyes equally or unequally, an excessive effort is made on the part of the opposing muscles, predisposes to the development of an inward or outward squint in or out of the visual lines, according to circumstances.

portionate tension of the vertically acting muscles is equal, esophoria or esotropia usually results. If there is an unequal vertical tension, exophoria or exotropia results.

In the case, it becomes a matter of the first importance to determine not only the absolute but comparative positions of the eyes, not only from side to side, but up and down.

Until quite recently, no sufficient means for measuring these rotations. The judgment which we may obtain by watching the rotations is not to be relied upon. The Tropometre is destitute of any considerable value for this purpose, as it is not possible to measure the downward rotation in the eye, for the pupil buries itself behind the lower lid; nor can we measure the rotation inward, for the nose interferes, nor the outward, the only one which can be generally measured is not well measured.

The Tropometre which I show you here, and which I have used for many years, serves, in this respect, a valuable purpose.

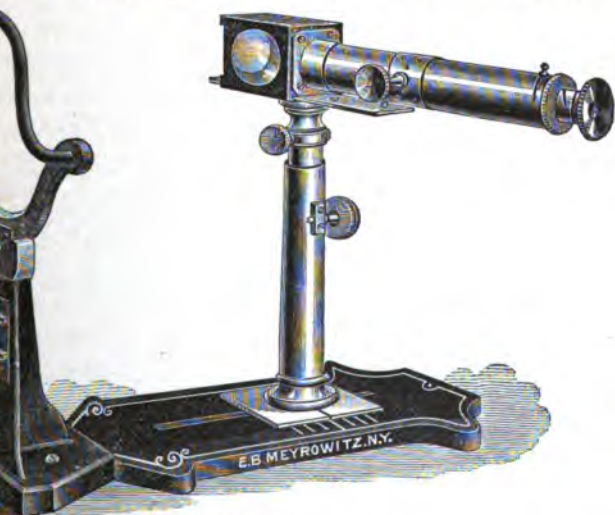


Fig. 1.—The Tropometre.

It is essentially of a telescope, in which the inverted image of the examined eye is found at the eye-piece, where,

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either as an aerial image or as an image upon a ground glass. Its movements can be accurately observed. A graduated scale in the eye-piece permits every movement of rotation in any direction to be exactly measured. For the purpose

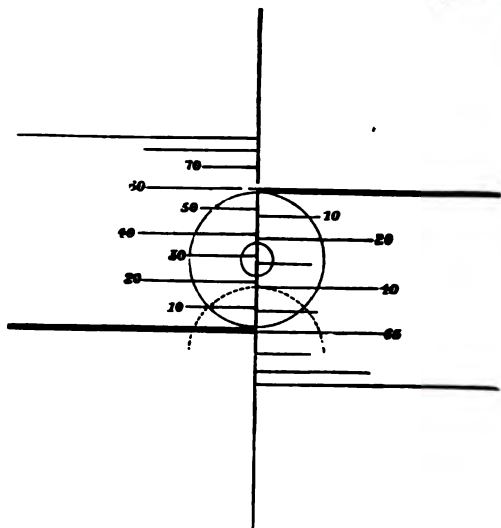


Fig 2.

Explanation of Fig. 2.—The long line between and at right angle divides two similarly graduated scales running in different directions. The larger circle represents the outer border of the cornea, the edges of which are in contact with the two strong lines. The interval between each pair of strong lines is ten degrees of an arc, commencing at the strong line in each direction. If the head of the person examined is held firmly in the primary position and caused to rotate strongly in a given direction, the arc through which the cornea passes may be accurately read upon the scale. In the figure the dotted line represents a new position of the border of the cornea. Suppose the person examined has been directed to look strongly upward. Then the scale is moved down the scale, and reaches the point in this example of 40°, a measure of this rotation.

By means of the small lever, the scale can be placed horizontally, vertically, obliquely, and by means of the two graduations, measurements in opposition can be made.

If it is desired to determine the upward rotation, the border of the cornea is moved to coincide with the strong line which appears in the upper part of the scale on the right hand. This adjustment is made by means of the milled head at the top of the standard. As the eye rotates up, the image moves apparently down. At the point of departure, the strong line at the lower left-hand side of the scale is as the point of departure. For lateral rotations, the scale is turned to the position, and the corresponding strong lines used as before.

In order to adjust the upper border of the cornea to the line, it may be necessary for the examiner to place the left hand upon the forehead and make gentle traction of the upper eyelid by the thumb. This adjustment of the hand to the forehead is advisable in all measurements, as by this means the examiner is able to detect even a slight movement of the head, which would vitiate the measurement of the rotation.

In adjusting the head to the head rest, the teeth should be closed, the upper lip just below the nose should be in a vertical line below the bridge just above the root of the nose. Exceptions will occur to the su-

g near the patient, and of presenting no obstruction which should fall upon the examined eye, a prism or an obliquely placed mirror is adjusted at the end of the telescope, permitting the examination to be instead of from the front.

We study the vertical actions of the eye muscles in connection with the lateral, we shall find that we have rarely—perhaps I shall not be betrayed into exaggeration if I say *never*—to make very free tenotomies in any direction in cases of extreme squint inward or outward, after we have accomplished the first stage of correction, which consists of establishing equal and proper rotations upon the vertical axis. There will remain so little to do that a complete division of an internal or an external rectus muscle can never be necessary.

In short, if we attend to *all* the elements which enter into the production of a lateral squint, instead of directing our attention exclusively to one muscle, and that generally the internal rectus, we shall never have occasion for great opera-

As we turn our attention to the question of indications for the division of tendons, we shall find that the question turns first upon the purpose for which the division is to be done. If it is for the purpose only of correcting a cross eye," which is the purpose so often, then there is little interest in its discussion. It makes little difference whether the division is made in the internal or external rectus. It is a subject belonging neither to science nor to art.

When the division is done with the definite and intelligent purpose of restoring binocular vision at *all normal points and under all circumstances*, we have a question of the highest scientific interest, and calling into service some most delicate and beautiful manipulations.

Years ago I advised, when there appeared a necessity for a very free tenotomy, to divide the effect between a moderate contraction of one muscle and a moderate tenotomy of the other, doing each upon both eyes, thus leaving the two opposing muscles as nearly as possible equal in power.

Years ago I advised, when there appeared a necessity for a very free tenotomy, to divide the effect between a moderate contraction of one muscle and a moderate tenotomy of the other, doing each upon both eyes, thus leaving the two opposing muscles as nearly as possible equal in power.

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in sum to the original tension, but with the amount as to bring about the desired effect.

Superficially, this appeared to be good logic and so. As a matter of fact, it was neither the one nor the other.

We must recur to the principles which I have already discussed in regard to tenotomies. We must first ascertain exactly why an eye deviates in this or in that direction; then, if surgical operations are required, we should determine whether the tensions are too great or too small. And here, upon the answer to this question, should the selection of a method be determined. How are we to know? The fact that, for example, in converging strabismus the eye is too far in, tell us what to do?

I know of but one method of solving the question and that is by the tropometre.

Let us, for illustration, assume that the temporal rotation should normally be 45° , and the nasal 50° , of arc. This would give us the sum of a normal rotation in the lateral direction about 95° . Then, suppose that the upward rotation is 45° , and the downward rotation 50° , the sum would be 95° again. Now, should we find in a given case that these rotations should largely exceed the amounts mentioned, it would be an indication for tendon shortening. I have found the percentage of these cases very small. The eyes of most people are usually, if not always, very prominent—almost protruded. The movements can be seen to expose large areas of conjunctiva, and the eyes swing in or out according to the conditions of fixation.

By far the greatest number of those who have lateral strabismus show no such excess of rotations. They are, in the majority, restricted to $\frac{1}{4}$ or even $\frac{1}{3}$ of the normal rotation. The tie up such muscles and to increase the already excessive tension may be to improve the appearance of a patient; it adds nothing in a rational way to an actual correction of the disabilities of rotation. I do not deny that eyes

to closer relations in certain directions by such
t I greatly question the wisdom of the method.
r, then, sum up an answer to the questions which
presented in a few words.

otomies have slight apparent effects when the muscle
n is not the muscle at fault, and tendon contractions
geous only when they are directed against a condi-
sles positively shown to be loose, not by the failure
to rotate in a single direction, but by a marked ex-
sum of rotations in opposite directions.

a useful lesson from these few suggestions, I would
case of strabismus convergens or divergens is to
from the standpoint of the tensions of all the eye
nd that a very large proportion of these, and es-
se of high degree, are the manifestations principally
tensions.

otation upward of the eyes, as shown by the tropo-
materially less than 40° , while the downward rotation
exceeds 50° or 55° , no correction for the lateral devi-
d be made until the rotation upward equals 40° or
yperphoria is absent. Or if the upward rotation is ex-
omparison to the downward, an analogous correction
be made before an internal or an external rectus

otations in all directions are evidently too great, in-
absence of proper muscular tension, tendon shorten-
resorted to, which will be very rarely. If the sum of
s is not excessive, tenotomies only are called for.

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ON METHODIC CURETTING OF THE CORNEA TREATMENT OF PTERYGIUM

By Dr. **DESCHAMPS** (Grenoble).

In 1888, Reynolds, in an American journal, advocates curetting of the cornea with a cataract knife, after removing away the summit of the pterygium.

Professor Panas (Courtesy thesis, May, 1894) excises the pterygium, slightly cures the point of implantation, the summit, and cauterizes this spot with a thermo-cautery.

As complement of excision of pterygium, nearly all the authors have adopted the actual cautery, which was first proposed in 1881 by Dr. Martin.

I think that in all cases cauterization, which is always difficult and impossible to limit exactly, should be replaced by curetting with the small curette which Dr. de Weck designed and constructed for curetting corneal ulcers.

The following is the method which I have employed, and which has had great success in five cases, one of which was a large pterygium.

The pterygium is raised from its position with fine forceps, detached by shaving the cornea with a small curette, then excised by a single cut of the scissors, or by two successive cutting cuts, one superior and one inferior. The eyeball is then fixed with forceps, and the corneal wound is very carefully and vigorously curetted, commencing at the summit. The debris which in the form of radiating bands and lamellae of membranes has been left adherent to the cornea is removed with the curette. The manoeuvring with the curette resembles that of a servant who little by little gathers up the debris toward the door of a room. The considerable debris always remains adherent to the cornea after the pterygium is detached and brought little by little to the border of the wound near the conjunctival wound, from which it is removed by irrigation. It is remarkable to see how perfectly the curetting with the curette cleans the cornea, so that the pterygium

of the pterygium was implanted, and where the
re situated, which are marked, when this method is
a kind of small floating white collar, can no longer
it is also remarkable, after dressing the eye, to see
of recovery. In three days the entire surface of
s re-covered with epithelium, there is no trace of a
process, no cicatricial opacity, and no scar to be
which too frequently leaves a cloudiness of the
here have been no recurrences of the five cases which
ted by this method, and I have no doubt that
uretting is better than the actual cautery, and has
lvantages.

ating the portion of the cornea which was covered
ygmium in the manner which I have described, the
unctiva containing the base of the pterygium may
by any of the ordinary methods. The object to be
immediate reunion. Autoplasty, performed as
y Dr. Chibret, accomplishes this very well. I
s freed the conjunctiva slightly above and below the
introduced two or three fine silk sutures to draw
together. When the loss of substance is a little
account of the large size of the base of the pterygi-
uently happens that after the sutures have been
are two falciform folds, one above and the other
conjunctival wound at the border of the cornea.
each on the border of the cornea, forming a small
this case I make a small incision with fine scissors
ar to each of the falciform folds. The small incis-
immediately, and under the influence of the two
the folds, from being perpendicular to the border
ea, become parallel to it, and are entirely freed from

These small liberating incisions act like any in-
elastic tissue, and stretch immediately in the direc-
traction is exercised.

way I have had occasion to treat large and multi-
ums, I have never performed a more complicated
l autoplasty, and my patients have all recovered

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rapidly without recurrence. I therefore desire to add nothing to this method, which has the great advantage of simplicity. I may briefly sum up my communication as follows:

1st. In the treatment of pterygium, careful curetting of the cornea should take the place of the cautery. This curetting disinfests the entire denuded surface of the cornea as well as any other method. It has the advantage of levelling it exactly and not destroying the functions of the organ.

2d. A simple conjunctival autoplasty by simple suture may be performed. A few small liberating incisions will usually enable one, if necessary, to free tense portions of the conjunctiva drawn by the sutures.

CERTAIN BACILLI FOUND IN A CASE OF OPERATIVE PANOPHTHALMITIS

By Dr. G. E. de SCHWEINITZ, of Philadelphia

D. C——, a man aged fifty-five, was admitted to the Jefferson Medical College Hospital, October 1, 1894, on account of a complete cataract of the left eye and beginning cataract of the right, the vision of the latter being $\frac{6}{7}$, with large floater in the periphery of the lens. The light field of the left eye was slightly defective upon the nasal side, and the visual perception not as acute as might be desired. The irides were however, were prompt, and the anterior chamber of normal depth. The tension was a trifle below the average normal.

Extraction was performed with the usual antiseptic precautions, on the 5th of October, but before the knife had crossed the anterior chamber the patient became absolutely insensible. The section was quickly completed and the patient recovered, but owing to the spasmodic contraction of the ciliary muscles, together with the squeezing of the lids together, a large quantity of semi-fluid vitreous was lost. The patient

l, twice swept the margin of his upper lid through
second day, a gray infiltration of the edge of the
visible, and in spite of the most active treatment,
n of the vitreous occurred, the eyeball becoming in-
d, and a thick, whitish mass appearing between the
wound and in the anterior chamber. Twelve days
ration was performed, and the thick, purulent mass
entre of the eye was placed in a carefully stoppered,
ottle for bacteriological examination. The lower
e cornea, which had remained clear, was similarly

logical Examination.—Dr. D. Braden Kyle kindly
the bacteriological examination, and isolated a rod-
s, uniform in size, slightly rounded at the ends,
as easily with any of the aniline dyes, but better
l blue. There was also a coccus present, which
on proved to be the *staphylococcus pyogenes citreus*.
to investigate the matter still further, cultures were
E. A. de Schweinitz, of the Bio-Chemic Laboratory
ton, for his opinion, and he returned the following
The bacilli are from three to five times as long as



n growing in chains, or several of them are joined
They grow on beef broth, and after twenty-four

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hours a pedicle is formed on the surface. They also liquefy gelatine, but do not liquefy it, and form a white film. They do not produce gas in the fermentation tube. They slowly coagulate milk, and grow on potato, forming a yellowish, reticulated layer. They liquefy blood serum.

In order to test the pathogenic character of this bacillus, injections of an emulsion of the surface growth on agar in broth were injected into rabbits' eyes by Dr. de Schweinitz, Washington, and by Dr. Kyle and myself, in Philadelphia, with entirely negative results, no more irritation being produced than would be expected from the slight wound of the cornea. When, on the other hand, a mixed culture was employed—namely, one containing the cocci—reaction was produced and the ordinary phenomena of suppuration appeared. Bacilli have been found in panophthalmitis in a number of examinations, in some cases being associated directly with the development of disease from the pathogenic standpoint.

Dr. S. Poplawska (1), in an investigation of the inflammation of the eye after injury, examined twelve cases with beginning panophthalmitis, and found bacilli in all of them, always in the vitreous, in the neighborhood of the body. There were two forms: a small, slender form with disposition to chain formation, and a large, long form.

In Finlay's group of cases (2), in one instance, the bacillus was cultivated both from the inter-vaginal space and from the interior of the vitreous. The patient suffered from panophthalmitis incipiens as the result of a perforating wound in the corneal region. The following is the description which she gives of this growth: "The bacillus was about 10 microns long, being rather slender. In cover-glass preparations, the growth in gelatine, they were arranged in zoölogical chains. The bacillus was cultivated in gelatine, agar, and potato. In gelatine it developed with the utmost readiness, liquefaction with extreme rapidity almost as soon as it made its appearance.

(1) *Archives of Ophthalmology*, Vol. XXI., p. 22.

(2) *Loc. cit.*

ted in second and third generations, the gelatine totally liquid in twenty-four hours. In a partially culture (made by pouring a layer of sterilized oil on e of the gelatine after making the puncture), the n took place much slower, not commencing for e growth being somewhat peculiar; from the central peculiar processes were given out, which were ar-sswise; gradually, however, the growth was totally In agar, the bacillus thrived both in its interior and face; in the latter situation it had a peculiar white, earance. On potatoes, the growth at first was yel- t ultimately acquired a chocolate-brown color, rese- ewhat that of the glanders bacillus." The patho- f this bacillus was established by inoculation into the f a rabbit.

or Haab has also found a peculiar bacillus in pan- tis, to which he attributes a specific character. An case is reported by Randolph (1), in a boy aged six, a penetrating wound of the ciliary region made with wire. Inoculations and control experiments proved organism which caused the inflammation was the *li communis*, which entered either with the foreign ater, through the wound.

sent bacillus cannot be classed with those of patho- acter, as experimentation proved its innocuousness. ility of contamination with pathogenic cocci must be uarded against in these examinations before ascrib- ppuration to the bacilli, because staphylococci may sent, as, for example, they were in the case which I

ce of cornea which was removed is of practically nstitution, the upper margin containing some lym- tration. Suitable stains failed to demonstrate micro- in the tissue.

II.—REPORTS OF SOCIETIES

CONVENTIONS

FORTY-SIXTH ANNUAL MEETING OF THE MEDICAL ASSOCIATION

At Baltimore, Md., May 7 to 10, 1895.

OPHTHALMOLOGICAL SECTION

(Reported by GEORGE T. STEVENS.)

First Day.—The Chairman, Dr. Edward Jackson, delivered the annual address, the subject being "The Strength of the Eye to Tolerate Mydriatics and Myotics," in which he described the method employed by him in ascertaining the smallest quantities of agents which would induce the physiological effect, and the quantities inducing the full effect, of the various agents in use.

The regular order of presentation of papers was then followed.

Incipient Cataract.

DR. A. R. BAKER (Cleveland).—Believes that there is a connection between diabetes and cataract, as well as a diabetic cataract. He reported two cases of cataract in which there was marked improvement in vision after the removal of nephritic cataract in which vision improved, for a period of years, from $\frac{2}{800}$ to $\frac{8}{80}$.

That many cases of cataract are due to local pathological conditions of the eye itself, he could not doubt, and might be cured by either local or constitutional treatment. He thought that many cases were too frequently dismissed with the advice, "Wait until the cataract is ripe," and that the profession do not give them the careful study they do many other diseases.

He suggested, in conclusion, that in all cases of incipient cataract: (1) the urine should be examined chemically and microscopically; (2) the general health should be carefully interrogated; (3) the axis of refraction should be corrected; (4) a careful examination of the fundus oculi should be made; (5) that the patient receive both general and local treatment as may be suggested by the above; (6) that a few carefully reported histories of cases from infancy to maturity would be of more value than statistics of hundreds of successful operations; (7) that if operative interference be necessary it should be instituted at the earliest possible moment.

health becomes impaired, preferably by Knapp's method of capsulotomy, with an iridectomy either at the time of operation or some time previously.

Alternative Treatment of Immature and Some Forms of Zonular Cataract.

DR. E. WEEKS, of New York City, stated that the most favorable time for the removal of cataract was at the period when the lens fibres had been separated from the lens capsule by the force of liquor Morgagni between them. A stage of swelling was always existing in the formation of soft and of rapidly developing cataract, but was said not to exist in the cases of nuclear cataract of sclerosed lens. Swollen lens fibres were not found detachable from the lens capsule. In many cases, in the case of ordinary senile cataract vision may become reduced to such an extent, at which point it may remain for a long period of time, a stage is distressing to the individual, as it renders him unable to perform the ordinary duties of life, and may entail expense on the patient, or patient's family.

Dr. Weeks' experience in the removal of non-cataractous lenses by the operation of house led him to conclude that all cataractous lenses in individuals twenty-five or more years of age could be removed with comparative safety as soon as the opacity had progressed sufficiently far to interfere with useful vision.

The operation for the ripening of immature cataract was performed a number of times, but was abandoned, as it was found that the lens cortex, although opaque, was still somewhat adherent to the capsule, and the removal of the cataract after Förster's operation was attended with as much difficulty as was experienced in removal of the cataract by Förster's operation. It also carried with it the chances of infection and bad results incident to the additional operation.

Extraction attempted by the author of the paper in all unsuccessful cases was simple extraction. As much cortical substance as possible was removed by external manipulation. Lavage was seldom resorted to. If a small amount of lens cortex remains in the eye it is sometimes absorbed and produces no inflammatory trouble. Dr. Weeks has never seen inflammatory conditions awakened by the presence of cortical substance in the eye after removal of immature cataract.

In twenty-five cases of extraction were reported, divided as follows : 10 cases of soft cataract, 3 ; zonular cataract, 5 ; immature, complicated cataract, 4 ; immature, diabetic cataract, 1 ; immature,

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senile uncomplicated, 12. There were no losses. Iridectomy done in 6 cases. Simple extraction in 19 cases. Total extraction in 1 case. Relapse of iris. Discussion of secondary cataract was in 1 case. The ultimate results were :

Acuity $\frac{1}{16}$ or better.....	13
“ $\frac{1}{32}$ “	2
“ $\frac{1}{64}$ “	3
“ $\frac{1}{128}$ “	2
“ $\frac{1}{256}$ “	5

The results appeared to the author to be as favorable as could be expected by the removal of cataract at the stage of maturity. Such relief to the patients by quick restoration of vision was obtained. Such operations should be done by expert operators only.

Dr. Frothingham agreed in the main with the views of the author but thought that it is the general experience that a cataract of opacity of the lens never clears. Slight changes dependent on constitutional disease or disease of the choroid may be arrested with improvement of the general or choroidal circulation.

Of the various operations for hastening the maturity of the cataract that of Förster is best and safest. In a certain proportion of cases it leads to iritis, but I have also seen synechia as a result.

Dr. H. Knapp.—Unripe cataracts not infrequently present an alternative of removing a cataract prior to the time when the patient's chances of a good recovery are greatest, or to wait an indefinite length of time for that most favorable opportunity which is the vogue into which the ripening operations have come is accounted for. They would be a godsend if their action was certain and free from danger. Unfortunately, many an operation for ripening has been done without producing any effect ; on the other hand, these operations have proved injurious by provoking iritis and its consequences, and some by a degree of deleterious modification of the eye (plastic and purulent irido-cyclitis and panophthalmitis). These mild or severe reactions occur only exceptionally, but are sufficient to have created by our own hands any condition which would have complicated the chances of the patient, when the operation, the extraction, has to be undertaken. I, for my part, prefer the risk of dealing with remnants by a secondary operation to the double operation of ripening and extracting the lens. In a majority of cases, requires a subsequent division, also, of the pupil.

Dr. White (Richmond).—Like other sclerosing processes

to a standstill, or may even retrograde toward recovery, such cases are rare.

Dr. (Chicago) doubts the propriety of accepting the stationary form of diabetic cataract ever spontaneously disappears. The types of so-called cataract arising from naphthalin or those arising from concussion, and it seems possible that such so-called cataracts are capable of disappearing.

Skin-grafting on the Eyelids.

Horz (Chicago).—Skin-grafting finds a great field in ectropium and entropium.

Grafting in Ectropium.—For a perfect reconstruction of the lid is very essential that the new substitute possess all the attributes of the normal lid skin. Thiersch's epidermis is the desired material, and are far superior to skin-flaps. The grafts are cut with a razor and directly transposed to the wound of the lid, where they are carefully spread out. When the whole wound is covered with grafts, two layers of silk protective are put over them; one layer is placed over the other longitudinally. Over these strips comes a dressing which is to be kept wet with a half per cent. solution of boric acid. Both eyes are closed by a bandage, to insure absolute rest during the healing process. It is also important that the operation should be fastened by ligatures, the upper lid to the cheek, and the lower to the forehead. After four or five days the good eye is opened; and after the first week the ligatures are removed and no further dressing is needed no more.

Grafting in Entropium.—In the extreme degrees of entropion it is easier and better to construct a new border than to turn in the old border. For this purpose the lid is split by the incision into an anterior edge (containing the eyelashes) and a posterior edge. When the anterior edge is drawn up, so that the eyelashes recover their correct position, there is a gaping groove which is to be filled with a wedge-shaped skin-graft. The dressing is bandaged for twenty-four hours; if by this time the graft is in place the success of the operation is assured; if the graft is dead, it is dead and useless.

These true skin-grafts for the reconstruction of the lid are Thiersch's epidermis grafts, or to the use of mucous membrane. Judging from my experience, I regard the fear that hairs grow on them as groundless. I have never seen any hairs grow on them, and I am inclined to believe that if hairs are found

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afterward they do not grow in the graft, but in the po of the lid border: they are eyelashes which the operator posterior edge when he made the inter-marginal incision.

Transplantation of a Strip of Skin into the Internal Space of the Lids.

DR. H. KNAPP.—In severe cases of entropion and tr results can be obtained by an implantation of skin in marginal space of the lid. The steps of the operation are

1. Ordinary canthoplasty.
2. Incision of the inter-marginal space, according to J
3. Curved incision of the skin to 4 mm. above the cil Removal of a small strip of muscle along this incision.
4. Grooving of the tarsus according to Streatfield.
5. Passing sutures through the lower lip of the wound edge of the tarsus, and the skin of the upper lip.
6. Detaching from the upper lip of the wound, with pair of scissors, a strip of skin 2 mm. broad, and as lon cision in the inter-marginal space, and implanting it into and cleansed incision. Sutures may be used, but are not
7. Tying these sutures, four or five in number. The be cut short, or stretched and fastened to the skin above collodion (Panas) or strips of plaster (Born), if the free lid is not sufficiently everted.
8. Dressing with bichloride gauze, greased with a salve the eye uncovered.
9. Cutting the sutures in from three to five days. CL eye every day gently, so as not to disturb the implanted in almost every case, unites in its whole extent. This p ation is to be simplified or modified according to the the case.

A Case of Cancer Involving Eyelids and Side Operation; Exhibition of Patient After Three

Dr. HERBERT HARLAN (of Baltimore).—This was a tensive epithelioma, involving inner end of both left eye ing to side of nose, and involving canals and lachryma previous operations had been done by other surgeons. cut out and a large flap turned down from forehead. T was performed more than three years before. The pat hibited, showing excellent result.

Dr. R. A. Reeve.—In using a flap without a pedicle permit wearing an artificial eye, it is desirable to impla

ble, so as to get the minimum contraction. Blepharohorizontal sliding flaps has given me gratifying results in instances.

Wann, the Secretary, referring solely to the paper by *Wann*, thought that the time will soon come when *water*, will be deemed the only suitable anæsthetic for nearly all connected with the skin. Cocaine, in solutions of over 1, endangering not only the life of the skin flap, but patient. Injections of stronger solutions of cocaine are and should be abandoned.

Reynolds protested against the use of strong solutions being dangerous.

Bernstein exhibited a patient who, when first seen, upper and lower lids and the entire nose by syphilis. been supplied by skin-grafting.

and thought Dr. Reynolds' fears of the dangers of cocaine stated.

Second Day.

Evisceration of the Eyeball.

WEBSTER FOX (Philadelphia).—Evisceration consists in incising the cornea and thoroughly removing the contents of the eyeball, replacing them with a glass globe.

First, the eye is thoroughly irrigated with an antiseptic solution. The conjunctiva is dissected back to the equator, the muscles intact. Then the cornea is excised, and the contents removed with a scoop, great care being taken to remove iris, choroid, and head of the optic nerve. The cavity is packed with cotton, which is removed after a few minutes, and the scleral shell is again irrigated. The glass globe is inserted by a specially devised instrument, the sclera split and drawn over the glass ball by sutures of catgut.

The operation is done under strict antiseptic precaution and no reaction follows.

and being equally as safe as enucleation, it has the advantage of supporting for an artificial eye.

and Bacteriologic Notes; Some Cases of Penetrating Wounds of the Eyeball.

E. E. DE SCHWEINITZ.—(See *Annales d'Oculistique*, this paper in full.)

Pathologic Significance of Albuminuric Retinitis.

LIVER BELT (Washington).—Though improvement of

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vision very frequently occurs in albuminuric retinitis, its importance in comparison with the life of the patient, a point which I wish to determine is the average duration of the appearance of retinitis from renal disease. The statistics before published upon this subject deal mostly with hospital cases, in which the duration of life rarely exceeds one year. Occasionally I reported a case in private practice which has survived for even fifteen years. I decided to try and find whether or not the average duration of life was greater among private patients than among hospital cases. With this end in view, a few weeks ago I collected quite a number of ophthalmologists throughout the country to report the cases which had occurred in their private practice. Cases were reported to show that the duration of life is longer among private patients, and that the renal affection is undoubtedly ameliorated by the hygienic surroundings. However, the number of patients surviving two years was disappointingly low, and the general opinion, as shown from letters received, seems to be that the disease proves fatal in less than two years.

The Technique of Tenotomy of the Ocular Muscles

DR. L. CONNOR (Detroit).—Cocaine to be employed in the operation in which the drug is tolerated.

A small opening is made in the conjunctiva and tenotomy is made directly over the centre of the tendon insertion, the tendons are divided in each way to their outermost extremities.

Tenotomy on corresponding muscles of each eye should be made, but if this does not accomplish the desired result, all attachments of the muscles are to be divided. If this still does not secure the desired result, sutures may be employed to increase it. These should be made to the superficial fibres of the sclerotic and be attached to the cornea by a fine suture. In case of the externi, the sutures from either side should be tied over the bridge of the nose.

If the immediate result of the operation is too great, it may be corrected by a conjunctival suture.

In tenotomy of the interni a slight convergence should be induced, a slight convergence should also be induced in case of the externi.

Binocular vision should be sought if considerable squint is present in the squinting eye, and prisms are of use as a guide to operation in estimating the result of tenotomy.

No dressing is required.

Light Effect Sometimes Obtained as the Result of Free Tenotomies of the Ocular Muscles.

LEOBALD (of Baltimore).—It is a recognized observation that free tenotomies of the ocular muscles a given amount of cutting always followed by the same amount of correction. Why this is the case we do not, as yet, fully understand. As a principle, the effect of a tenotomy depends upon the extent to which the attachment of the muscle is set back—the greater the setback, the more marked the effect, and *vice versa*. Hence, when a marked effect is wanted, we divide not only the tendon, but the capsule, more or less freely, and when only a slight effect, we make a partial section to the muscle. To this extent we can control the effect; but the fact remains that in different individuals similar operations not infrequently yield markedly different results. While we do not fully understand the reason of this, we are not, not wholly in the dark as to the matter. As a rule, the effect of a tenotomy upon a large, prominent eye will be more marked than one upon a small, deep-set eye. Hence, we may anticipate a greater effect from an operation upon a myopic than from one upon a hypermetropic eye. The size of the muscle operated upon is also thought to influence the result, the effect being less marked when the muscle is strong and well developed. The elasticity and strength of Tenon's capsule may also have an effect. In different individuals the muscle, when separated from the sclerotic, shows a marked tendency to retract toward its orbital attachment, which would, of course, increase the effect of an operation. His experience inclined him to the belief that tenotomies for heterophoria yield, as a rule, less marked results than those for strabismus. The striking instances of slight effect from free tenotomies which he had met with all occurred in operations upon the internal recti for esophoria. Two cases only were met with, though others almost as striking had been met with. In the first case, a school-girl of sixteen, a free tenotomy of each internal rectus was done without producing an appreciable effect. Previously existing esophoria of 9° to 11° . In the other, a girl, aged twenty-six, a free tenotomy upon each internus, would have sufficed in many cases for the correction of a strabismus, diminished the pre-existing esophoria by scarce-

Limitations of Tenotomy of the Ocular Muscles.

WARD F. HANSELL (Philadelphia).—1. *Esotropia*: (a)

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Alternating.—The deviation is upward and inward. prolonged paralysis of the accommodation followed by full H. have proven inefficacious, tenotomy of each internal ing the operation equally between the two muscles advancement of either externus, is the proper procedure stant.—Tenotomy of either or both interni is unavailing external of the squinting eye is also advanced. Se superior of the same eye is often necessary.

Exotropia: Adduction must be raised to the normal tonics and advancement of the muscles. Tenotomy is o for we are destroying instead of building up—weakeni set of muscles to correspond to an abnormal conditio tagonists. Correction of ametropia which will deman the accommodation in near work, prism exercise, and ad one or both interni, with or without section of the ex recommended.

Hypertropia: In concomitant squint, hypertropia ne ment; in constant squint, tenotomy of the superior r deviating eye is often necessary.

Hypertropia unconnected with error of refraction a lytic is an extremely rare condition.

Heterophoria: A very large proportion of the cases an error of refraction, and require no surgical interferer

Esophoria: A course of atropia or other mydriatic full correction, will often remove the symptoms for wh seemed to be indicated. When operation is necessary, both interni, carefully performed and its effect watche times cure. It will, in many cases, be necessary to repea ment seems to be indicated only when it is shown that not only relatively but absolutely too strong.

Exophoria: Tenotomy is powerless to effect more than cure. Advancement of the interni will often permanen

Hyperphoria seldom demands operation. Partial tenotomy is to be performed only when full correction i

A description of the operation of advancement pre writer.

Tendon Advancement, with Special Indication Employment.

DR. C. H. THOMAS.—The reader advocated tendon in place of tenotomies. He thought the method of Ste one required in all cases of advancement.

s for and the Advantages and Technique of Tendon Shortenings.

SAVAGE.—Muscle-shortening is indicated in all cases of strabismus, regardless of the direction or extent of the turning.

With less than 8° of abducting power and low degrees of turning should be treated alone by shortening of a rectus.

This has the advantage over advancement of greater ease and gives freedom from torsion.

In muscle-shortening, Dr. Savage recommends an operation in which is made a long horizontal incision through conjunctiva and sclera, by the aid of two strabismus hooks under the muscle. At the anterior and posterior extremities of this wound, he introduces a suture in the form of a double loop, the posterior portion of which is drawn twice through a perforated metal plate. By drawing upon the suture, a fold of tendon and capsule is made, the cord is tied, and the suture and metal clamp are permitted to remain six days. This method can be applied to slight cases of heterophoria as well as to

Points in Insufficiencies of the Ocular Muscles.

WALTER PARK (Harrisburg).—A summary of his views on the insufficiencies of ocular muscles is as follows:

Following up one's cases for one to two years is necessary. Surgery should be done in all muscular insufficiencies, to tabulate the results of publication.

In cases involving the recti muscles, occurring in hyperopia and hyperopic astigmatism of from one-half to fifteen degrees, corrected with errors of refraction, will generally all do well. In refractive errors corrected, muscular exercises, outdoor treatment, and the temporary use of prisms.

Those occurring in myopia and compound myopic astigmatism do not use of prisms more constantly, and are not benefited so much as those by muscle-exercising as those occurring in hyperopia, and myopia with advancements are generally more effective in myopic cases.

The Superior Rectus Muscle.

DR. BERNSTEIN (Baltimore) read a paper on this subject in which he called attention to the anatomical relations and the function, he records three simple and uncomplicated cases of the superior rectus.

The paper lies in these facts: that the superior is only a part of the eye when there is abduction of 23° degrees;

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otherwise its function is that of elevation, slight adductory rotation of the corneal axis toward the nose. Its not the inferior, but the inferior oblique muscle. That treatment proves futile after the lapse of sufficient time treatment is indicated, but of all things, not tenotomy of the inferior rectus, but either advancement of the paretic muscle or tenotomy of its fellow in the other eye; sometimes de Vries' scleral advancement will suffice. As to the etiology, it is in addition to anatomical causes lesion of the twig of the motorius supplying this muscle is also a factor, just as with the separate twigs of the recurrent laryngeal. A surgical anti-luetic treatment is cited as proof.

Dr. Bernstein calls attention to the treatment of strabismus, claiming that though he sees it relatively frequently it is necessary to do more than correct whatever ametropia is present with tonic treatment. He moreover doubts that the assistance of a quarter-degree prism is often needed.

These papers were then discussed by DR. STEVENSON, who made the following remarks in full, *Annales d'Oculistique*, this number.)

Third Day.

Report of the Committee on Legislation for the Relief of Blindness.

DR. L. HOWE presented the report. The committee made a favorable report of progress, stating that many States had enacted such laws as they advised, and that good results from their enactment were already reported.

Extensive Colloid Changes in the Choroid, with Special Reference to the Cases.

DR. J. T. CARPENTER, JR.—The diagnosis of choroiditis from choroiditis, tuberculosis, or changes due to albuminuria is an important.

There is a constant relation between senility and the masses in one group of cases, and an entire absence of masses in a second group. The almost invariable situation is in the macular region, symmetrically arranged in the

Two Cases of Hemorrhage into the Retina and Choroid.

DR. H. FRIEDENWALD.—Both cases present such evidences of vascular disease as to lead to the view that hemorrhage into the retina of young persons may often be due to similar

Two Cases of Ectopia Lentis.

Y (Kansas City).—One of them was congenital, occurring in a family of nine children, seven of whom were similarly affected. The father, not now living, had the same defect. The children (three girls and four boys) ranged from four to six years of age. All of the nine children were hyperopic.

Enchondroma of the Cartilage of the Upper Lid.

R (Philadelphia).—In 1888 Mrs. P—— consulted him, complaining of a lump in the upper lid which had grown slowly during the last year. It was hard, solid, and attached to the cartilage. When removed was hard and cartilaginous, cutting crisply, and had the appearance of thickened cartilage. Two years later it had returned, larger than at first. Again it was removed, two years later still, she returned with a similar tumor in the same place. The whole of the cartilage of the lid and the conjunctiva were then removed.

Microscopic examination showed the tumor to be enchondromatous.

Specimens prepared by Dr. Wilder, of Chicago, and sections preserved in formaline and mounted in glycerine. The specimens shown the agent served the purpose of preservation better than agents hitherto in use.

Infiltration Anæsthesia.

MURDEMANN (the Secretary).—The paper was accompanied by demonstrations of the process.

Murdemann had introduced Schleich's method of infiltration anæsthesia in America, six months since, many favorable reports had been received regarding its efficiency and practicality. Experiments proved that a variety of fluids, when injected into the skin, would produce a practical local anæsthesia, the advantage over cocaine that the solutions are non-toxic.

Water injected into the skin produces anæsthesia, but is of no value. A normal salt solution is painless, but causes no anæsthesia, however, of two-tenths per cent. sodium chloride produces anæsthesia. Two-tenths per cent. of menthol, carbolic acid, and other agents have similar effects. The effect of the solution is increased by cooling.

In the operation is to be made aseptic, the solution is introduced by a fine needle passed obliquely under the epidermis to the subcutaneous layer, thus producing a white elevated wheal, anæsthesia.

thetic throughout the entire thickness of the skin, and in two to twenty minutes, by inserting the needle in the center of the wheal and repeating the injection until an anesthetic required extent and depth is infiltrated.

Painless operations have been performed for ovariectomies, amputations, and down to boils, felons, lid operations, etc.

Infiltration anæsthesia is especially valuable in ophthalmic surgery.

A patient was introduced from whose forehead two tumors were removed in the presence of the members, anæsthesia being effected by Dr. Wurdemann by infiltration, the patient experiencing no pain.

Case of Lymphangioma Cavernosum.

DR. S. C. AYRES (Cincinnati).—The patient was fifty years of age. For four years, and probably longer, the eye had grown more exophthalmic, until finally it became so prominent as to be unsightly. There was no pain in the eye, but there had been several attacks of severe pain in his head, associated with tingling in the right side of his body. There was also a general mental habitude. He became dull and listless, and lost interest in his surroundings.

The eye was advanced 8 mm. beyond its fellow. There was marked papillitis. $V = 0.2$.

Enucleation was made, and the tumor measured 35 mm. It was within the muscular cone, with the optic nerve passing over its anterior portion.

The examination showed it to be a lymphangioma cavernosum.

Reference is made to Forster's case in *Græfe's Ophthalmology*, XXIV., 2, p. 107, and Wiesner's, in Vol. XXXII., 2, p. 107.

A Study of the Direction of the Shortest Meridian of the Cornea in 2,500 Pairs of Eyes, of Which 1,300 Were in Private and 1,200 from Public Practice.

DRS. RISLEY and THORINGTON.—The following table is a summary of refraction errors and direction of meridians in 2,500 pairs of eyes—1,300 in private, 1,200 from public records.

	PRIVATE.	
Simple myopia.....	7	.5%
Simple hypermetropia.....	72	6.0%
Monocular astigmatism.....	70	5.0%
Binocular astigmatism.....	1151	88.5%

Total cases.....1300

	PRIVATE.		HOSPITAL.	
<i>Asymmetrical astigmatism</i>	694	60.2%	618	74.4%
<i>Symmetrical astigmatism</i> ...	310	26.8%	158	19.8%
<i>Irregular astigmatism</i>	123	10.6%	40	5.0%
<i>Other astigmatism</i>	24	2.1%	17	1.0%
Irregular Astigmatism—				
<i>Conforming to rule (homologous)</i> ...	543	78.2	559	97.7
<i>Not conforming to rule (heterologous)</i>	151	21.8	54	2.3
<i>Asymmetrical astigmatism</i>	694		613	
<i>Symmetrical astigmatism, total</i> ...	318		158	
<i>Conforming to rule</i>	223	71.8%	126	79.1%
<i>Not conforming to rule</i>	87	28.2%	32	20.9%

of Meridians of Shortest Radius in All Cases of Symmetrical Astigmatism.

90°.....	57.0%
Inclined symmetrically 19° or less.....	19.7%
“ from 15° to 30°.....	4.0%
“ from 30° to 45°.....	1.0%
0°.....	12.0%
Inclined 15° or less.....	4.0%
“ from 15° to 30°.....	2.0%
“ from 30° to 45°.....	.5%

COMMITTEE ON EXAMINATION AND CARE OF EYES DURING SCHOOL LIFE, ETC.

The committee report the difficulty of formulating any recommendations that shall be generally acceptable and practicable in the varying conditions presented in various localities. Yet that we should aim at a satisfactory completeness in such plans, even although this should be commonly beyond possibilities. The prime difficulty to be met is apt to be due to local jealousy, and we must frankly deal with this obstacle if we are to have the best men subject themselves to the adverse consequences likely to fall upon those advocating, or even carrying out, such examinations. The school authorities will offer some opposition if done with considerate economy of time and friction, and examinations will generally receive their support. Parents or guardians rarely oppose such studies unless arbitrarily enforced or in ways suggestive of personal exploitation, but extreme

caution must be exercised both in inaugurating and continuing the work. Much may have to be done without remuneration on foot these investigations, and a mere honorarium, given to the vaccine physician, is probably all that will be accorded to the school physician.

The examinations heretofore made have been too cursory and slipshod as to afford no real knowledge of the present or future prospects of the eyes. Examination as complete as is to a puzzling case in private practice is demanded in the school if we wish to learn the real and essential facts. Besides accommodation, muscle relations, and color-sense determination, refraction should be studied by retinoscopy and direct ophthalmoscopy (with perhaps glass tests also), and the eye ground should be minutely studied as to changes in choroid and retina. Unless such minuteness can we avoid missing, in many cases, the facts in the matter.

The report of the results should be made only simply and directly to the school authorities for their utilization and transmission to the parents; but minute record should be preserved of everything including the above-noted data, the date, reported general complaint or evidence of conjunctivitis, etc., and all cases of notable irritation in the fundus or other conditions present. The present or future safety should be certified as requiring or not requiring medical attention. Much may be done in a crude way by teachers or other non-experts when complete examination is not possible, but full justice can be done in the examination only by a skilful ophthalmologist.

Latent Astigmatism.

DR. HORACE M. STABKEY.—Latent astigmatism is a frequent and important cause of asthenopia. Latent astigmatism may in many cases, be made manifest without a cycloplegic, and without interfering with the patient's business, by giving, lenses which will make manifest error, which may be worn a day or two, when an amount of astigmatism will be manifest, which may be corrected in the same way, and so on till all the latent trouble is unmasked. This may be done without discomfort to the patient, and is therefore a very advantageous with the sceptical, the irritable, and the nervous. The recent text-books do not give this subject the attention it deserves. Astigmatism may be latent whether the axis of curvature is vertical, horizontal, or diagonal. The special cases illustrating the foregoing points.

General Conditions That Change Corneal Curvatures.

AUTERBACH (Philadelphia).—Regular corneal astigmatism, the result of a variety of forces acting upon the cornea, these usually so accurately balanced that it results in the proportional astigmatism, a low degree of astigmatism with the

astigmatism is always corneal or lenticular, but usually

consist not only of the muscles of the eye and of the orbital resistance, the intra-ocular pressure, and even the muscles are concerned, as well as the tonicity of the cornea. That interferes in any way with the accurate balancing results in the production of astigmatism, modified or in accordance with the excess or deficiency of the power

condition which interferes with the texture or nutrition predisposes to change in corneal axes and curvatures. Constitutional affection in any way modifying the general and thus changing the corneal nutrient supply predisposes to changes.

Equality of forces, when long continued, affects healthy eyes, giving rise to slow, regular, progressive changes in the axes of astigmatism, or of both.

Unequal forces, acting upon corneæ weak from local or constitutional causes, produce more rapid and violent, often instantaneous changes in the axes or degree of astigmatism, or of both.

Forces acting unduly on the corneæ should have their action moderated as possible.

Under the influence of unequal forces should be put at the earliest possible moment.

Corneæ, from general or local conditions, after being put to rest, should be promptly and efficiently treated in order to render them healthy.

In the affections, a study of the corneal changes will serve to guide in otherwise obscure conditions.

By studying these corneal curvature changes in connection with the kind, degree, and axis of astigmatism, indications for the treatment of the eye muscles will be obtained that were otherwise impossible.

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THE OPHTHALMOLOGICAL SOCIETY OF NETHERLANDS

Seventh Session, held at The Hague, June 9, 1901

Neuro-paralytic Keratitis.

Dr. WESTHOFF.—The case was one of complete paralysis of the fifth nerve following a gumma of the Gasserian ganglion. paralytic keratitis was typical.

Dr. van Moll.—I have seen a patient in whom the greater Gasserian ganglion had been removed for neuralgia. Sensibility was much diminished on that side, and there was also lagophthalmos and paralysis of the third nerve. In spite of the lack of protection of the eye, the cornea was almost healthy.

Ocular Traumatisms.

DR. BOUVIN.—A patient whom I have observed since November 1900 received a blow on the left eye three days before that time. The patient had severe pain, and noticed that a large amount of blood escaped from the eye. The eyeball showed an extensive hemorrhage on the sclera outside and above, about 2 millimetres from the limbus. The wound was closed, and contained a little pigment. The anterior chamber was filled with blood, and the tension was much increased. Three days later the blood was reabsorbed, and tension was normal. Some haziness of the vitreous prevented a view of the fundus of the eye, but the patient had perception of light. On November 1901 careful examination showed that the iris and the lens were in place. Complete reabsorption of the hemorrhages required three weeks, but now the retinal vessels can be seen with the naked eye. The eye is no longer irritated, and the iris must have escaped from the eye through a wound in the sclera and the conjunctiva at the time of the accident.

Dr. Blok.—I have seen complete aniridia following a rupture of the fist on the eye. The rupture of the sclera was situated above the cornea. After absorption of the blood which filled the anterior chamber the lens was found to be dislocated backward into the vitreous. Three months after the injury vision was $\frac{1}{8}$, but it was not possible to enucleate the eye later, on account of absolute glaucoma caused by the dislocation of the lens.

Dr. van Rynberk.—I saw a case of aniridia fifteen years ago, which is interesting from its strange origin. A workman received a blow on the eye from a hammer while fastening a bolt, and

with a rupture of the sclera. An attendant, seeing the patient through the rupture, and thinking that this was dirt, removed the membrane, which he threw away. The patient picked this up and brought it to the Ophthalmic Institute to find out what it was. The iris was complete. After reabsorption of the hemorrhage the aniridia was found. The lens was in its place, and unaltered.

The Contagiousness of Trachoma.

DE MEYER (Amsterdam).—All that I have to say on the contagiousness of trachoma is based on clinical experience. It is a small minority of ophthalmologists who deny the contagiousness of trachoma. Most of the oculists of Amsterdam believe in its contagiousness.

DE MEYER and *van Rynberk* were of the same opinion.

DE MEYER mentioned, on the other hand, the wide distribution of trachoma by its introduction by contaminated armies, and epidemics of trachoma, as indisputable arguments in favor of the contagiousness of trachoma.

Atrophy of the Optic Nerve and the Genital Organs.

DE MEYER had seen the following triple anomaly in three cases: atrophy of the optic nerve, atrophy of the genital system, and amenorrhœa was the first symptom. Atrophy of the optic nerve was accompanied by concentric narrowing of the visual field. The atrophy of the genital organs was a simple non-inflammatory atrophy. The same was seen after a castration.

Myopia in Eyes of Normal Appearance.

DE MEYER.—I have examined 350 young men of almost the same age, of whom 106 had a visual acuity less than that required for military service, without its being possible with the ophthalmoscope to detect any disturbances in the media or alterations in the deep membranes. After eliminating those whose vision was not less than the normal for their degree of refraction, and hysterical cases, and cases of simulation, there remained 171 cases. To be sure, I am not figuring on cases in which errors of refraction were present. In any part, 65 of these were excluded. The 106 remaining were divided into isometropes and anisometropes. Each group was divided according as only one or both eyes were affected. The latter group was again divided into two parts: normal binocular vision, and those without it. The figures thus obtained seemed to prove that neither anisometropia nor absence of

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binocular vision can account for the amblyopia. The an amblyopia, in the sense of Schwegler, must, then, be

Goldzieher attributes this amblyopia to traumatism at birth. Nounhoff, who has examined the eyes of fifty children who died during delivery, has found hemorrhages of the choroid in many of the cases. It is very probable that congenital amblyopia is caused by very small ruptures of the central portions of the retina during labor.

Drs. Blok and van Moll described cases in which either the exclusion of the good eye produced rapid improvement in the amblyopic eye, which is contrary to the conception of Straub.

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of July 2.

Ocular Affections of Dental Origin.

DR. PARINAUD made a report on an article by Dr. PÉCHIN on the same subject. Dr. PÉCHIN thinks that reflex affections are losing ground. This is true, but reservations should be made as to pupillary disturbances. Before considering infection, inter-traumatism should also be investigated.

As for infection, it is propagated by various channels, namely, vessels, lymphatics, and bone. The osseous channel is more frequent than is supposed, and necrosis of the maxilla in children is probably most frequently of dental origin.

Blepharoplasty.

DR. ABADIE presented a child who had been operated on with great success by the Italian method. The flaps were cut from the arm, and, while attached to their pedicle, were transplanted to the two lids.

Congenital Malformation of Both Optic Nerves.

DR. DESPAGNET presented a patient in whom both optic nerves were in the form of a crescent. There was also myopia and astigmatism. This was a case of arrested development, and the patient was a neuropathic who had hysterical hemiplegia.

retinitis and Detachment of the Retina.

DE SPÉVILLE presented a patient fourteen years of age with lesions of chorio-retinitis and a detachment of the retina, suggested an intra-ocular neoplasm. The disease had been treated by injections of cyanide of mercury, but the improvement did not persist.

of Interstitial Keratitis Not Caused by Hereditary Syphilis.

DE SPÉVILLE read a report of an article on this subject by Dr. The latter communicated a case of interstitial keratitis during the course of acquired syphilis, and a second case of corneal infiltration of the cornea resulting from influenza. He remarked that the latter case was not one of true interstitial keratitis, but of corneal infiltration, a lesion which is not characteristic of influenza.

Dr. Gley, in animals deprived of their thyroid glands, in which the pancreas had been removed, has observed that interstitial keratitis develop in both eyes of these animals. DuVigneaud, Gley, and myself published descriptions of this condition in the *Archives de physiologie* and in the *Bulletin de physiologie*; they show the possibility of double interstitial keratitis from experimental cachexia.

Presentation of an Old Model of Forceps.

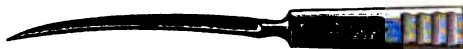
Dr. ECKER.—The model of these forceps exists in the collection of the Museum, and is one of the surgical instruments discovered by the late Dr. Ecker.

Use of the Knife of Pellier de Quengsy; the Use of a New Knife with Convex Blade in Cataract Extraction.

Dr. Terson.—Pellier de Quengsy, a French oculist of the 18th century, performed the operation for cataract with a simple, narrow knife, curved, and with convex blade. An example of this knife was found at Toulouse, a city which Pellier de Quengsy had lived in a long time. It was this example which Dr. Terson, having received it from Dr. Maraval, presented to the Society. In the principle of Pellier's instrument, Dr. Terson has in the last operation, for the last two years, employed a slightly modified knife, the length of von Græfe's knife, with convex blade to a point. The shoulder and the curve are much smaller than in Pellier's knife. This knife acts in the following manner:

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ner, after a series of operations: being narrow, like knife, it is easily managed. Its slight curvature en



measure the size of the section with the same precision straight knife. Its curved back prevents any confusion cutting edge and the back, an accident which is possible von Græfe knife, and this curve renders section of the sible. The curve of the blade facilitates the semicircular and lengthened bevelling of the incision.

Pseudo-Membranous Conjunctivitis Treated with manganate of Potash.

DR. JOGQS treated a child with pseudo-membranous conjunctivitis the nature of which was not established by bacteriological examination. Instillations of a weak solution of nitrate of silver aggravated the corneal lesions, and they were replaced with $\frac{1}{10}$ to $\frac{1}{20}$ solution of permanganate of potash, with good results.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of June 13.

Nine Cases of Chancre of the Lids and the Cornea

MR. SNELL has observed nine cases of chancre of the conjunctiva. Their situation was as follows: 2 at the angle, 1 at the external angle, 3 on the upper lid, 1 on the lower lid, 1 on the palpebral conjunctiva, and 1 on the bulbar conjunctiva. The patients' ages were as follows: two years and eleven months, twenty, twenty-one, twenty-eight, twenty-nine, thirty-five years. In all the cases the pre-auricular ganglion was enlarged. In some cases the sub-maxillary ganglia were enlarged. In one case the chancre had been produced in a syphilitic child.

Mr. Marshall had treated a man twenty years old

had a palpebral ulcer which did not yield to anti-syph-
ment.

Griffith thinks that the principal interest in these cases
agnosis, which is extremely difficult until the secondary
cours. Two lesions may be easily confused: 1st, a vac-
; 2d, a tubercular ulcer.

aner had seen about eight or ten cases of palpebral or
l chancre.

Ophthalmia Nodosa.

YFORD had seen a case of ophthalmia nodosa, a disease de-
Sæmisch, and which results from the penetration into
issues of the hair of certain caterpillars. This caterpillar
y zoölogists under the name of "bombyx rubi." The
e unilateral. For six months the patient had had inter-
fering. Two hairs were removed from the lower portion
unctiva.

e eight or nine cases described in medical literature, all
e of German origin. Whenever it was possible to deter-
nd of caterpillar, it was found to be "bombyx pini," or
ubi."

y, the hairs were removed by comrades or playmates.

incipal signs of the disease are inflammation of the conjunc-
ation of the cornea, and frequently a severe attack of
do-choroditis, with opacities of the vitreous.

e cases small gray nodules have developed in the con-
ne episcleral tissue, or the iris. Histological examination
this tissue resembles tubercle tissue. About the central
are numerous giant cells.

l cases vision was seriously compromised by pupillary oc-
t there had never been complete blindness. One case
a June, and all the others in August, September, or

Session of June 24.

Lecture on Subjective Visual Sensations.

VERS chose the study of subjective visual sensations as the
the annual lecture in memory of Bowman.

al vision of each eye depends on the associated action of
ghest visual centres, while central vision in the two eyes
from the action of a single centre. These propositions
proven by the study of floating specks observed by epilep-
tics subject to migraine.

ACADEMY OF SCIENCE

*Session of June 17.***The Direct Action of Light on the Iris**

MR. CH. HENRY has endeavored to solve the question whether the iris of the living man is sensible to the direct action independently of the stimulation of the retina by light.

With this object in view, he has constructed a pupilloscope which enables him to show that the pupil always dilates when the iris is submitted to the action of light without any illumination of the retina. A dark-colored iris will dilate more than a light-colored one.

The author considers this fact as an explanation of the phobia of iritis where the retina is not involved in the process.

III.—BOOK NOTICES**BOOKS AND THESES**

Anatomy of the Nerve Centres, by Dr. J. DEJERINE. (Paris, 1895, Vol. I., 816 pages, quarto, with 401 illustrations in the text, colored.)

"The anatomy of the central nervous system is essentially a question of anatomy: to follow the fibres which compose it, their origin, course, and termination, such is the object of the work. All those who, since Vicq d'Azyr, have studied this branch of anatomy. In spite of the perfected methods of investigation which we have at our disposal to-day, there still remain, especially in connection with the brain, many obscure points to be elucidated."

"Great progress has been accomplished in this subject in the last few years, and it seems to me that the time has come to attempt in one work the present condition of our knowledge of the axis of man."

Such is the programme which the author lays down in the preface of his work, and the book contains what the preface promises. There are very few diagrammatic sketches in the book, because the extensive studies of the author and his collaborators have enabled them to elucidate cerebral anatomy by original illustrations. In addition to the study of normal anatomy and secondary degeneration the

representations of a single preparation reproduced by photograph in connection with cerebral morphology by drawing or by macroscopic and microscopic sections. All who have been modelling will recognize the advantages of this method of illustrating a treatise on the anatomy of the brain, and will appreciate the amount of work necessary for its execution. The illustrations forming the basis of Dr. Dejerine's book have been obtained by making serial microscopical sections from normal or pathological brains previously hardened.

minical and pathological material collected for a number of years. The author, Dr. J. B. Sicétre, has enabled him to control the results given by the method of secondary degeneration. The book, therefore, appeals to the physician as well as to the anatomist. The volume contains four principal chapters: general methods of histology, embryogenesis, histogenesis and histology, and the anatomy of the various organs.

This latter part, the anatomy of the brain, comprises, contains the greatest amount of personal work and number of new and interesting facts. The texture of studied by the aid of a series of macroscopical and sections, made in the horizontal, vertico-transversal, directions, thus giving the data necessary for the syn- e brain. This latter includes the origin, course, and of the various fibres of the brain: fibres of association et two more or less distant regions of the cerebral cortex, fibres which unite the two hemispheres, and, finally, the em of fibres of projection.

and volume will describe the connections between the ganglia and the lower nerve centres, and the third the cerebellum, the medulla, and the spinal cord.

rs, Messrs. Rueff & Company, have spared no pains to
k a perfect setting.

ne's book is the key to the nosography of diseases of the
em which has been built up in the last half century by
(Bologna), Vulpian, Brown-Séquard, and Charcot. It
eable to the anatomist and the clinician, and among the
s will doubtless seize the opportunity of having a solid
rpreting the complex phenomena of central lesions of
nd motor apparatus of the organ of vision.—SULZER.

MEDICAL JOURNALS

Bilateral Dacryoadenitis of Tonsillar Origin,
(*Semaine Medicale*, 1895, No. 5, p. 37.)

The patient was a man twenty-five years old, and had a symmetrical swelling of the lids, affecting more the external portion of the upper lid. This infectious condition was the result of a tonsillitis in the course of recovery. The disease had commenced on November 1 from a cold, while the patient complained of ocular disturbance, lachrymation in both eyes, and on the appearance November 25. On the next day, the 26th, he felt a slight smarting in the external angle of each eye, and four hours afterward his lids were red and swollen. The patient has a swollen face, a pronounced coryza, and a pre-auricular ganglionic engorgement. In the external part of the upper lid there is a slight projection, painful on pressure, hard, mobile, lobulated, and with its longest axis transverse. This feeling of ganglionic engorgement is very distinct on the left side, but is not so perceptible on the right.

On raising the lid, the conjunctiva is seen to be slightly inflamed and projects regularly into the external portion of the conjunctival sac, and under the bulbar conjunctiva are seen several small, whitish, purulent concretions. The lachrymal secretion is exaggerated and accompanied by a purulent secretion. The pre-auricular ganglion on the left side is swollen. The movements of the eyes are somewhat diminished in extent, without strabismus. There is no exophthalmos. Vision is perfect in the right eye. The left eye has been blind for a long time.

The tonsils are also engorged, and covered with a purulent exudate which is easily removed. The sub-maxillary ganglia are also enlarged. There is also an abundant coryza, with muco-purulent secretion. The patient, in the last few days, has had repeated epistaxis. Bacteriological examination reveals the presence of a great number of virulent streptococci and a few staphylococci in the secretion from the throat and nose.

There is, then, a lesion in both lachrymal glands, involving the lacrimal gland, shown by palpation, the cellular and lymphatic elements of the lacrimal gland, converting it into a sort of cedematous paste.

Dr. Panas lays particular stress on the multiple etiology of dacryoadenitis. He reviews cases of unilateral dacryoadenitis of tonsillar origin due to direct infections arising from the

and places them in relation with the acute simultaneous, simultaneous, inflammation of the two glands, causing an action appearing or existing with parotid inflammation. It must be mentioned measles, influenza, and urethral

The chronic form of bilateral dacryoadenitis is gradually distinguished from the symptomatology of oedematous of the gland. It may follow the acute form, or develop in the form of a chronic infectious disease, such as tuberculosis, or syphilis.

Successful Cataract Operations on a Dog, by Dr. ROBERT COLPE. (*The Johns Hopkins Hospital Bulletin*, February.)

Cataract is not uncommon in the lower animals, operations and successful removal are rarely reported.

(*Annales d'Oculistique*, 1842) says that he has often seen a veterinary surgeon, operate on horses, and he adds that he has frequently operated on these animals in Brogniez's cases. He does not tell us that the cases were cataract, nor the result.

Authors have from time to time written of operations on animals, but in general we are left with as little information as we have of Brogniez's cases.

He operated on a young pointer entirely blind from catarrh of both eyes. In three weeks the pupils were dilated and sight was fully restored. The dog was taken on and proved as efficient as ever.

ITEMS

There has been made *Professeur Extraordinaire* of Ophthalmology, Faculty of Medicine of Amsterdam.

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OF OPHTHALMOLOGY

243 CHARLES ST., BOSTON, MASS.

SALES D'OCULISTIQUE

Volume CXIV.—Number 2.

AUGUST, 1895.

ORIGINAL CONTRIBUTIONS

MEMOIRS

CURABILITY OF SYMPATHETIC UVEITIS

By Dr. **ROGMAN**,

Physician in Chief to the Ophthalmic Institute of Ghent.

Results obtained in the treatment of plastic inflammation of the uveal membranes from sympathetic cause have been classed these affections among the most pernicious pathology. Thus Knies (1) justly estimates that the cure of an eye inflamed from sympathy is, ordinarily, more difficult than that of its mate disorganized by traumatism.

When considering the degree of malignity of this affection, if the literature is investigated, it will be found that the cases which are described as having progressed to blindness have been reported by the inventors of or adherents to a particular therapeutic method, and who have been pressed to publish the results which they have obtained, but who are not free from the suspicion of not having been sufficiently guarded from that premature publication ordinarily attendant upon recent discoveries.

As well established recoveries are found. In summary statistics of Professor Schiess' clinic, at Bâle,

(*Grundriss der Augenheilkunde*, 1888, p. 235.)

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Waldspühl (1) only found four cases in a period which terminated favorably.

The sombre aspect of sympathetic ophthalmia still more on closer analysis of the majority of successes; indeed, these are but improvements or registered on leaving the hospital. But in cases of this situation is almost always an ephemeral one, created in the mind of the patient, and sometimes of the physician, which recurrences of later appearance cruelly deplete the rich statistics of Vignaux (2), which concern not only immediate results but also the more distant consequences of an attack, furnish ample material for reflection.

My personal experience has taught me that caution is necessary in predicting the future of patients suffering from sympathetic ophthalmia. In an article published in 1877 I reported the case of a man, D. M.— (Case 1, 1877, 18 years previously had suffered from sympathetic ophthalmia resulting from necrosis of the cornea of the other eye. For details, see the original article.) Enucleation and the appropriate methods, employed for several weeks, were successful during the first attack. The following year, prolamellar membrane became necessary on account of a relapse, and the patient, who was seen some time afterward and told to report the slightest indication of a relapse, was supposed to be cured when I learned later that, having had another relapse, he was discouraged by misfortune and shaken with age, and had the heart to undergo the fatigue of further treatment. He had become completely blind.

The frequency of relapses, which may occur after a considerable interval, justifies the reservation with which the hope of a definite recovery from sympathetic ophthalmia is made. Restrictions, in this respect, should not, however,

(1) WALDSPÜHL : Vier Fälle von gehellter sympathische Ophthalmie. *Thesis*, 1892.)

(2) VIGNAUX : De l'ophtalmie sympathique et spécialement de son traitement par l'énucléation. *Paris*, 1877.

(3) ROGMAN : Sur l'opportunité de l'énucléation dans l'ophtalmie sympathique. (*Annales d'Oculistique*, Vol. XCII., p. 185.)

ated scepticism. If it is thought, says Hirschberg, receipt of Solon can be observed, and that a patient declared cured when he has reached the end of his result of this pretension would be that only aged have had almost a century's experience, would be now and then, to publish some rare case.

tenance of the *statu quo* for a term which exceeds siently long time the ordinary period, one to two ng which, at the latest, from common experience, cur, seems to me to constitute a sufficient guarantee ry to fulfil all reasonable exigencies.

hese conditions, and as epilogue of the article to ve referred, I am happy to be able to mention another ch the recovery was more lasting than in the one de- ve. This was Case II., which I will briefly recapitulate te. A man, J. V. L——, had an attack of sympa- cycloclitis in the left eye, resulting from a penetrating he right eye, and the injured organ was enucleated summer of 1882. After subsidiary treatment last- months he recovered so that he was able to resume s dyke watchman. He had a relapse in November, recovered again after four months' treatment. On 1884, his vision was $\frac{1}{2}$, and on June 8, 1884, it was as seen again on October 27, 1884, suffering from ara-central ulcer of the cornea, but he had recovered yclitis. He died in 1887 of pneumonia, having, ac- the statement of his attending physician, preserved ty of his vision, which had improved after the cure r.

years I have had occasion to meet with two more recovery, the first of which may be regarded as defi- the second, too recent to be claimed as such, merits on account of the peculiar circumstances which char- and the promising conditions which it presents. ing is a description of the cases:

—Leonie V. A——, a girl twenty years old, of Moor-

slade, had received a severe injury in the right eye from a cow. When she came to me, eight weeks later, on October 3, 1889, I found the following condition :

The right eye, which was in course of atrophy, had an external region a horizontal cicatrix stretching from the cornea to half a centimetre beyond the border of that region. The cicatrix was irregular and already strongly retracted. All light was abolished. Inflammatory symptoms were still present.

The left eye, from the information which I received, was attacked, fifteen days before, with photophobia, lachrymation, blepharospasm. There was a large amount of periorbititis. The aqueous humor was cloudy. Deposits had formed on the posterior surface of the cornea. The iris, which had been insensible to the action of atropine, was immobilized by synechiæ. Ophthalmoscopic examination of the fundus was impossible on account of the opalescence of the media. Vision was reduced to counting fingers at 50 centimetres.

October 3, 1889 : Enucleation of the injured eye ; operation for sympathetic uveitis ; hygienic precautions, atropine, mercurials, iodides, etc.

On March 31, 1893, the girl was able to leave the hospital in possession of sufficient vision to perform her work in the institute. She continued to employ atropine, mercury, and iodide. She had regular visits to the institute.

There was no recurrence.

On March 14, 1893, vision was $\frac{5}{50}$. The iris, attached to the entire extent of its posterior surface to the lens, was atrophied. The border of the pupil was ragged, and the iris, in the form of fibrillæ with a radial direction, was attached to the lens at various distances from the axis of the eye.

To a request for information which I addressed to her, the patient replied with a long letter, dated March 27, 1893, in which she told me that she had been married last year, and that her vision had remained good and enabled her to perform all the work she was required to do.

Case IV.—L. V. M—, a woman forty-eight years of age, was brought to me in 1887. The left eye had been burst open by a blow, and she had been obliged to have this organ enucleated five weeks after the injury on account of alarming symptoms in the other eye (loss of vision, inflammatory symptoms, etc.). Her condition was aggravated, and she came to my clinic on February 12,

even days had already elapsed since the enucleation, and had been performed in a perfectly regular manner. No sensitive region in the orbital cavity, and the region of the nerve was painless.

In the right eye characteristic sympathetic irido-cyclitis. Bound by numerous synechiæ, and no longer responded to atropine. The fundus of the eye could not be examined. The patient could count fingers at a distance of 20 centimetres. The lower portion of the visual field.

The treatment was employed as in the preceding case, with frequent sub-conjunctival injections of cyanide of mercury in 1% solution at various intervals.

There was gradual improvement, and on August 9, 1894, the patient was able to return to her family and resume her work in a factory. She has partially continued the treatment prescribed at present time.

On November 31, 1894, vision had increased to $\frac{5}{20}$. The appearance of the iris was similar to that above described. The fundus of the eye could be seen through the cloudy media.

In answer to a request for information which I addressed to her, the patient sent me a postal card, dated March 21, 1895, stating that the condition of her eye had remained good.

In addition to these personal observations I think it will be sufficient to describe several others, the only ones, in my collection, that have appeared during the last fifteen years. They have not been controlled by a sufficient lapse of time after the onset of the affection. They are five in number: three published by Schirmer (1), one by Hirschberg (2), and one by Laqueur (3). I will briefly summarize them:

(1) Schirmer).—W. Bienert, thirty years old. Wound of the eye from a piece of iron. Six weeks later, December 6, 1891, irido-cyclitis in the right eye. The pupil still reacted slightly to light.

The vitreous was cloudy, and the outlines of the disc were indistinct. Fingers were counted at 2 metres.

SCHIRMER: Klinische und pathologisch-anatomische Studien zur Pathologie der sympathischen Augenentzündung. (*Arch. f. Ophth.*, XXXVIII., 4, 224.)

HIRSCHBERG: Sympathische Erblindung dauernd geheilt. (*Centralblatt für Augenheilkunde*, 1891, October, 288.)

LAQUEUR: Bericht über die 21ste Versammlung der Ophthalmologischen Gesellschaft. (*Monatsschrift für Augenheilkunde*, 1901, p. 110.)

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Heurteloup leeches, cataplasms, and mercury.
On December 12 the left eye was enucleated.

December 15, the pupil was dilated to its maximum
injections of pilocarpine were given.

January 7, 1885 : Vision was $\frac{3}{8}$.

In March, 1885, there was a relapse, which was quickly
sweated treatment. The visual acuity then acquired
remained on October 27, 1892.

Case II. (Schirmer).—G. Kanopka, forty-one years old.
left eye had become blind as the result of a blow. Four
the right eye was attacked with plastic iritis, with
nechia. The pupil only partially responded to atropine.
of the eye could be seen through a cloud. Fingers were
8 feet.

December 6, 1882 : Atropine, cataplasms, inunctions
carpine.

January 4, 1883 : Enucleation of the left eye.

January 18 : Fingers were counted at 20 feet.

According to a communication written October 24, 1892,
dition had remained quite stationary.

Case III. (Schirmer).—G. Volkman, five years old.
the left eye from a knife. Complete blindness. Four
a half later, inflammatory symptoms in the right eye
the posterior surface of the cornea, iritis, circular syn-
ties of the vitreous, and fundus of the eye invisible.
counted at 8 feet.

August 25, 1884 : Inunctions and warm fomentation.

September 9 : Fingers at 20 feet ; enucleation.

October 11 : Disappearance of inflammatory symptoms.
remained the same.

December 1 : Hypertonia ; two iridectomies.

February 19, 1885 : Relief had come to the eye, but
of vision still remained.

December 7 : The fundus of the eye appeared some-
V= $\frac{3}{8}$.

According to a communication received October 3, 1892,
condition of vision had remained constant.

Case IV. (Hirschberg).—A carpenter, twenty-five years old,
received a severe perforating wound in the left eye from
wood. With appropriate treatment, vision was re-es-

able to count fingers at 4 feet. Six weeks afterward, 1878, there was pain in the right eye, diminution of vision in spite of the use of atropine, a circular synechia was

After: Enucleation of the left eye; mercury, leeches, etc.

2: The inflammatory symptoms had subsided.

7: Hypertonia. Atropine was abandoned, quinine administered.

27: Blindness from an attack of glaucoma; injections of atropine.

22: $V = \frac{1}{18}$.

9: Another attack of glaucoma, which disappeared spontaneously.

7, 1880: The eye was no longer troublesome, and the patient could read Snellen $1\frac{1}{2}$ at a distance of 5 feet.

10, 1891: The patient wrote that he had been able for some time to continue his work as a carpenter.

(Laqueur).—At the session of September 15, 1891, of the Association of Physicians at Heidelberg, the author gave a summary of two cases of chronic simple myopia, one of which was that of a shoemaker who, after recovering from his attack, had performed the duties of his profession regularly for two years.

A comparison of the cases which I have summarized shows that the duration of the period during which recovery was maintained was, respectively, one and a half years (Case II., my own), five years (Case IV., my own), seven years (Case I., Schirmer), nine years (Case III., Schirmer), seven years (Case III., Schirmer), twelve years (Case II., Schirmer), and two years (case of Laqueur). They all represent, in a condition which may rightly be considered as permanent, a certain amount of doubt might, with respect to the last case.

In my Case IV., which has not yet undergone the sufficient lapse of time (nine months).

In my own Case I., I may remark that the blindness occurred in the absence of, and possibly on account of the lack of treatment. It is not illogical to suppose that proper treatment might have brought about recovery the last time, as in the other cases.

Relapses or late complications occurred in five of my own Case I., one year after the first attack, and an undetermined period after the second attack; one recovery in my own Case II., two months after Cases I. and II. of Schirmer, and nine months after of Hirschberg.

The other cases, Cases III. and IV. of my own and of Schirmer, remained definitely cured.

The conclusion from this essay is that sympathetism is a disease of extreme gravity, the prognosis of which must be reserved for a long time, by reason of possible recurrences.

It is not right, however, to attribute to its development the character of desperate fatality with which certain medical authors endow it.

Undoubtedly, the only truly efficacious treatment is symptomatic treatment. The cases which I have reported show that in its active period, especially at the beginning of the disease may yield to the treatment then used, provided it is employed energetically and with the necessary persistence.

ETIOLOGY AND TREATMENT OF INFECTIOUS ULCERS OF THE CORNEA

By Dr. **Ch. ABADIE.**

Various articles have already been published by other authors on the subject of infectious ulcers of the cornea, principally dealing with their pathogenesis. I have shown that several conditions were necessary for the production of these ulcers. It is necessary first to have a more or less extensive lesion of the cornea; in the second place, an infectious agent must be present. Finally, the third condition is that the infectious agent shall remain a sufficient time in contact with the corneal tissue denuded by the traumatism.

Let us review each of these conditions in detail, and see how they are practically realized.

real lesion is commonly brought about by a wounding or penetration of a foreign body into the cornea, blows with a stone or brick, as with masons, stonecutters, and road-sweepers; scratches of the cornea, from spines, as with gardeners, or from a blade of grain at harvest time (harvesters' keratitis). Most frequently the corneal lesion is manifest, and the patient is well aware of the moment when it was produced. In other times there may be a simple erosion of the cornea which may pass perfectly unnoticed and lead to a suspicious appearance. This is precisely what happened in the case of the patient whose history is given further on.

It is probable that the contamination may be followed by its proper development, probably necessary that the infectious agent shall remain for a certain time in contact with the proper corneal tissue which has been laid bare. This period of incubation must not be interrupted by any intervention, or the affection will be arrested in its development.

Under these conditions, indispensable for the growth of an infectious ulcer, easily explains why this disease is never met with in a private clientèle composed of people of cleanly habits. First, they are less exposed to injury; and secondly, by daily care, any lasting contact with the cornea of an infectious agent which might harm it.

Study of these etiological conditions shows us, then, that the disease is always of purely local origin; that it has nothing to do with the constitution of the patients, and that the methods of treatment should be local rather than general.

Before very clear ideas were held as to the nature and genesis of infectious ulcers, the prognosis was extremely grave, and the therapeutic results disastrous.

Formerly, recourse was had to ointments, antiphlogistics, and cataplasms. Internally, under pretext of restoring the system, tonics were given. Nothing was of any avail, suppuration of the cornea was the rule, and frequently phlegmon of the orbit could not be avoided. At the present time, on the contrary, it may be said that we are absolute masters of the

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situation, even in cases of the gravest appearance intend to prove.

Of course, it is understood that if the patient late in the disease, with very extensive or total sup the cornea, it is not in our power to restore the have been destroyed, but we are always able to portions which still remain intact when the patient consultation, and can absolutely prevent the further the ulcer when we have it to treat from the beginning.

To accomplish this object, several methods are posal. We have, first, the method of Sæmisch, which in incising the ulcer transversely, cutting beyond and freely opening the anterior chamber, which is cleansed by antiseptic irrigation. This method first step toward progress, and was undoubtedly su other forms of treatment employed up to that time had to give way to the actual cautery, introduced in ology by Martinache and Gayet. Properly managed, actual cautery gives marvellous results. With the a thermo, or, better, a galvano-cautery, the invaded touched, and the action limited to the portion attacked.

In the centre, going a little deeper, the anterior penetrated so as to cause an escape of the aqueous ready infected, and antiseptic fluids are introduced. not dwell too long on this technique, nor on the results which it produces, and which are well known. What I wish to say is that to-day we have a new method. Thanks to sub-conjunctival injections of introduced into our present practice by the perseverance of Dr. Darier, we can, in a large number of cases with the actual cautery. This is a very great advance. Cautery is, in fact, an heroic method, but it has its inconveniences. In the first place, it always leaves a more extensive leucoma at the points of application with vision. Furthermore, as the result of opening the anterior chamber, strangulation of the iris, with all its evil consequences, may result.

-conjunctival injections of sublimate no such results
ared, and the following cases prove the surprising
which may be obtained with this new method of treat-

, forty-eight years old, a stonecutter, came to my
bruary 2, 1895. The patient had a very extensive
lcer of the cornea, with considerable hypopyon in
e. On interrogation he told me that about fifteen
he had received an injury in his right eye from a
of stone. He had at first considered this injury as
quence, but in three or four days began to suffer,
the eye with a solution of boric acid given to him
naclist. Since then his condition had only been
he suffered constantly, and no longer saw with the

amining him, I was struck with the conformation of
which was flattened at the base, with large nostrils
, and in fact a most disagreeable odor escaped from
ossæ. On both sides, the region of the lachrymal
to be swollen; there was, however, no real dacryo-
pressure on the sac did not cause any pus to escape
chrymal openings. For two years there had been
n in the eyes, but until the present time this had
ry troublesome.

ea of the right eye presented a veritable purulent
east a third of its extent, and there was abundant
This was evidently an infectious ulcer which had
r fifteen days without treatment.

a was so disorganized that it seemed to me to be indis-
ough the invaded surface with the galvano-cautery,
rrest the process and to modify the vitality of the
tissue. In addition, I slit the lachrymal canaliculus
d the lachrymal ducts of this eye with a 1 to 2,000
ublimatè.

lised points were cauterized, and the anterior
ely opened and cleansed.

dressing with iodoform ointment.

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On the next day, improvement; the pain had ceased, hypopyon was only slightly reproduced.

Change of dressing, irrigation of the lachrymal sac, also, on account of the ozæna, tepid nasal douches. A Weber siphon with a 1 to 5,000 solution of sublimate. On the following days the same treatment was continued. The improvement continually advanced, and soon there was no more extensive leucoma of the cornea, which, however, required me to make a useful artificial pupil. The patient was able to work.

On March 15 following he returned to the clinic. At this time complained of his left eye. For two days, he had received no apparent traumatism, this eye had been lachrymating, and somewhat painful.

I found a yellowish ulcerated point on the lower portion of the cornea, and a little pus in the lower part of the anterior chamber, the contents of which were somewhat turbid. Vision was very defective, and the patient, who was a bookbinder, could no longer work, and could scarcely read. It was evident that this was a commencing infection.

Wishing to preserve the integrity of this eye at a time when the other was already seriously damaged, instead of using the galvano-cautery, which always causes some injury, I made a sub-conjunctival injection of two drops of a 1 to 500 solution of sublimate. At the same time I slit the lower canaliculus of this side and cleansed the lachrymal sac with a 1 to 500 solution of sublimate, iodoform ointment, and a bandage.

On the next day, improvement was manifest. The yellowish spot, the commencement of corneal infiltration, was the same as on the day before, but it had not extended. The contents of the anterior chamber were clearer and vision improved. Iodoform ointment, irrigation of the lachrymal canaliculus, douches with a Weber siphon, with a 1 to 500 solution of sublimate.

On the following day, improvement continued. There was no more hypopyon, but the yellowish point of infection

still persisted. Another sub-conjunctival injection of a 1 to 1,000 solution of sublimate.

Following days, the condition continued to improve, patient was finally completely cured without the slightest lesions in the cornea.

is interesting from several standpoints. The lesion of the eye was common and classical. But in the left eye at the initial traumatism was so insignificant that it went unnoticed, and the disease might have been considered spontaneous. It is probable that some foreign body of small size simply scratched the superficial epithelium of the cornea and that, as the lachrymal ducts were in bad condition, an infectious agent, coming from the nasal fossæ, had invaded the denuded corneal tissue.

This article read before the Ophthalmological Society of London stated that ozæna was a frequent source of infection. That to be well assured of the recovery of infectious ulcers under such conditions it was necessary, also, in the case of the ulcer, to disinfect the lachrymal canals and the

Success was obtained with sub-conjunctival injections, emmetropic, without surgical interference and without touching the cornea, was very remarkable, and was of the greatest importance, for the patient had already been much injured by the disease in the other eye. I could certainly have cured it with the thermo-cautery, but not without damaging the cornea to a more or less extent, and diminishing vision.

I remember having encountered patients in my career who became blind as the result of infectious ulcers of the cornea, caused also by more or less insignificant injuries, which first attacked one and then the other eye. They suffered, as in the present case, from ozæna, and the nasal fossæ were constantly the receptacles of infectious material ready to be poured into the conjunctival sac and to invade the cornea as soon as it was denuded at any point where the protective epithelium was absent.

Here is another case which likewise shows the action of sub-conjunctival injections of sublimate, its superiority over the other methods of treatment employed.

M. B——, forty-one years old, a gunsmith, came on March 23, 1895. The patient had begun to trouble with his right eye about eight days before. He had consulted various people, but his condition had only been temporarily improved. He had an infectious ulcer of the cornea, which had advanced without appreciable injury. This eye had been closed for a long time, but there was no suppuration in the eye. The pressure over it caused nothing to come out through the natural openings.

The ulcer, sharply cut, as though punched out, was quite extensive, and the fundus was yellow and opaque. A large hypopyon occupied the lower portion of the anterior chamber, formed of thick yellow pus which was but slightly displaced with movements of the eye.

I made a sub-conjunctival injection of 2 drops of a solution of sublimate, 1 to 1,000. Iodoform ointment was applied into the eye, and a compress bandage was applied. One gramme daily of salicylate of soda was given. The patient had eczema and arthritis.

On the next day there was a noticeable improvement. The local pain and headache were less, and the patient was more comfortably, something which he had not done for so long. The bandage was changed. Locally, there was no change in the appearance of the ulcer, which was still sharply cut, deep, and looked as if perforation were imminent.

On March 25 another sub-conjunctival injection of the same amount as the first was given. The next day, decided improvement, no pain, and the aqueous humor clearer. The inflammation had diminished, the ulcer had commenced to disappear. The borders were becoming rounded, there had been no suppuration, and there seemed to be nothing further to fear.

On March 29 another sub-conjunctival injection of the same amount was given, and the condition rapidly improved.

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OF OPHTHALMOLOGY

l 2 the hopopyon had completely disappeared and
r chamber was quite clear.

on April 10, the patient could be considered as defi-
ed, the ulceration had subsided, and there remained
only a slightly apparent grayish spot. Vision was
it was not necessary to make an artificial pupil. In
l case the infectious ulcer was already very exten-
I feared that I should be obliged to use the galvano-
As can be seen, the sub-conjunctival injections of
were sufficient. This method, then, should assume
place in line, for it enables us to avoid destruction of
l tissue and perforations of the cornea, with the pro-
rich so frequently accompany the use of the actual

INTERNAL SCLEROTOMY

By Dr. L. de WECKER.

g the description of my method of sclerotomy, I
pecial attention to the manner of withdrawing the
hich deserves careful attention. . . . The handle of
ment is lowered in proportion as the blade of the
es the anterior chamber, in such a manner as to in-
he point the trabeculæ of the canal of Fontana, and
ly the external layer of the sclera."

or de Vincentiis practises this kind of incision in a
nsive manner, which he designates by the name of
of the tissue of the angle of the iris. Dr. Taylor, his
described this operation to the Congress at Rome (1)
lowing manner, and I have seen the author himself
he operation at Naples:

done," says Dr. Taylor, "with the instrument which
e honor to present to you, and which is composed of

ncisione del' tessuto dell' angolo iridico. Roma, 1894.:

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a handle upon which is fixed a fine metallic shaft curved in its longitudinal direction, with elliptic terminations by a little curved knife, very delicate at its tip, of which the convex border is the cutting one. The curved knife and the shaft are so disposed that on introducing the instrument into the anterior chamber, on withdrawing it it is impossible for the aqueous humor to escape. The instrument is made to penetrate into the anterior chamber, traversing the sclera obliquely at a distance from the periphery of the cornea and in the direction of the horizontal meridian, and it is carried in its extent directly opposite to the point of penetration. The point of the instrument is insinuated into the triangular angle of the iris, and is caused to execute a slight rotation about its axis in such manner that the point may be directed against the sclera. Then, in withdrawing the instrument, the tissue of the angle of the iris is incised to the whole extent comprised between the point of entrance and that of the counter-puncture, always excepting a small segment in the vicinity of the point of penetration, so as to be able to withdraw the instrument more easily and to prevent the escape of the aqueous humor from an opening at the bottom of the wound."

This incision of the pectineal ligament and of the layers of the scleral tissue may be very easily executed with the special instrument, using my straight cataract knife. In the absence of that, a Græfe knife, thinned and sharpened by repeated grindings.

This *internal sclerotomy* is, then, executed in the following manner: The knife is inserted at a full millimeter from the transparent border of the cornea, so that the back of the knife is pointed exactly in the direction of the horizontal meridian. When the counter-puncture is reached, and the point of the knife has disappeared under the opposite border of the cornea, the arches of the pectinate ligament are incised by the point of the knife, on withdrawal of the instrument, by executing a semicircular movement. The pressure

to the resistance which it is supposed will be encountered from the sclera; while this may be somewhat accentuated in old persons, it may be, on the contrary, somewhat moderate when it concerns young subjects, in order to avoid abundant hemorrhages.

General rule, only eyes with deep anterior chamber operated on, with the pupil contracted *ad maximum* and instillations of eserine, so that the point of the incision will pass in front of the least possible portion of the cornea. The thin, straight knife retains the aqueous humor sufficient up to the moment of its withdrawal, so that the iris will fall upon the blade, and there is no exposure to the vitreous membrane. There is no inconvenience in continuing the incision up to the instant of withdrawal of the knife, with a slight escape of the aqueous humor. I believe that it is easier for the operator to feel with his fingers the resistance or pressure which he should exercise with the point of the knife, a sense gained by frequent practice—than it is possible with a small curved knife attached to a more or less flexible handle. The management of which necessarily demands a certain amount of practice. The preference is always to be given to the method of de Vincentiis, if the operation is to be upon a shallow or reduced anterior chamber.

Sclerotomy owes its special action to the thinning of the cornea by a separation of the incised lips, and this division of the cornea acts essentially upon the pectineal ligament and the insertion and anterior insertion of the ciliary muscle. Its effect could, then, be derived from a modification in intra-ocular pressure, and very probably, if the incision should be made to include the whole circumference of the angle of the chamber, bringing about a change in the function of accommodation, and perhaps also in the curvature of the cornea, facts which are still to be verified.

Regarding the mode of action and the anatomical modifications, Taylor thus expresses himself:

"According to Taylor," says he, "the effects of the operation upon the iridian angle, you can, gentlemen, easily ac-

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count for it from the microscopical preparations v the honor to show you. It is shown from these p made from the eyes of the dog, that this operation trabeculæ of the tissue of Fontana, by means of v munication from the anterior chamber with the lym cunæ comprised between these trabeculæ, lacunæ found dilated, and often even remarkably distended incision has penetrated deeply, so far as to involve of the ciliary muscle, as it often happens, the muscles are then divided or separated, and (I wish to call attention to this point) not the slightest inflammatory the ciliary body results from it. There is observed cases an augmentation of the volume of the lymph fascicular spaces, and a direct communication between same spaces and those of the tissue of Fontana. The fibres of the internal layer of the sclera are divided between them there is seen to be interposed a connective new formation.

"I think that we may deduce, from that which has been shown, that the incision of the tissue of the angle assures an easier elimination of the intra-ocular fluid through the anterior passages of filtration. It may be demonstrated by simultaneous injection in the dog of an equal quantity of colored liquid (fluorescein) in the anterior chamber of an eye operated upon and that of the eye not operated upon. It is observed, then, that this liquid disappears more quickly from the eye operated upon than from the other."

A quarter of a century has now elapsed since the curative action of iridectomy in glaucoma has been given a greater facility of filtration given to the excretory apparatus of the eye by means of an incision of the eyeball with the excision of the iris. This theory of filtration is the basis of the operation and is now generally admitted (1), and, as may be seen

(1) Dr. Rochon-Duvigneaud published an interesting article on this subject, titled "Treatment of Primary Glaucoma" (*Gaz. des hôpitaux*, 1895). My colleague, in this article, says: "All the preceding operations and classical sclerotomy, endeavor to realize what I call *temporary* relief; they cannot admit that when a cicatrix is linear, white, and almost invisible

has also served our Italian colleagues as an interest in internal sclerotomy, otherwise called incision of the iris.

It is, not without surprise that I have seen that he who executes *very extensive* divisions of the angle of the eye thought proper to severely attack this theory in a recent (1), holding that "the filtrating power of the cicatrix has not yet been demonstrated, even clinically," and "However, taking this supposition as point of departure, Dr. Snodgrass devotes all his efforts to give a great importance to sclerotomy, claiming that in its effects it is solely allied to the *filtrating cicatrix*, while, on the other hand, he tends to diminish the importance of iridectomy, as his constant clinical experience should renounce facts and cling to hypotheses."

My esteemed colleague is not informed of that which has been done and published on this subject, for the prin-

tion, even though the glaucoma remains cured. Professor Schnabel, who explained this a long time ago. The artificial production of an opening that there is really filtration at its seat, and that during the time—in other words, the realization of *permanent filtration*—is in spite of numerous attempts, an accomplished fact." Dr. Rochon-Duval is better than any one else how delicate is the study of the physiological action of the aqueous humor in what he calls the scleral sinus. Even though the existence of a cicatrix may not necessarily show an appreciable modification, if it has produced has included this venous sinus, the physiological filtration may have been definitely modified by a change of filtration in the eye. I have already shown (see "The Filtration Cicatrix"), in 1882, that the cicatrix serves their ectatic aspect (oedematous) in a more permanent manner when they are operated upon for acute glaucoma. But if the *glaucomatous symptoms* are brought about by a *transitory* cause, there is no reason for persistence of this quality. In proportion as the equilibrium between secretion and absorption is established its rôle is abolished, and this at the same time that the resorption is effected, which, by its exaggeration, maintained the filtrating action of the cicatrix. I see no reason, then, why, with the prolonged disappearance of pressure, the cicatrix should preserve its filtrating qualities, when re-established, should an increased pressure return, by a reopening of the eye as I first proposed. In any case, this filtration, as will be seen further on, should be regarded as effectual exclusively by the cicatrix; the effect may be due to the cicatrix, as that takes place in the ordinary conditions of filtration, or to the exterior aspect need reveal itself to denote the modification in the normal flow of the aqueous humor.

Mechanism of the Action of Iridectomy in Glaucoma, by Professor de la Revue *général. d'ophtalmologie*, Nov. 30, 1894.)

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ciple of cicatricial filtration was from the beginning in order to explain the action of iridectomy at an sclerotomies were done; in the second place, sclerotomy introduced into practice, I have always held, Mauthner, that iridectomy is superior in its curative sclerotomy.

Experimentally and clinically, the proper value of filtration cicatrix has been definitely settled.

Let us here recall what Leber said in 1873 on this question (*Gräfe's Archives*, Vol XIX., p. 105): "I have demonstrated that there is no direct communication between the anterior chamber and the blood vessels, but that the fluid may easily filter, and this even under weak pressure, through the veins near the scleral border, and be carried away through the lymphatics. Further on, Leber demonstrates by his experiments that a moderate increase of the contents of the ocular globe, in equilibrium, by an increase of the escape, may be rapidly accomplished. Finally, he arrives at this important conclusion: *a filtration, starting from the anterior chamber, takes place in all cases up to a certain point with an increase of pressure, and it also very probably occurs in the ordinary condition of the eye.*

The result of Leber's important work upon the fluids (*Flüssigkeitswechsel*) of the eye is the demonstration, especially interesting in connection with anterior chamber dissection, complete or incomplete, "that the pectineal ligament is also during life especially destined for the escape of the aqueous humor, and that the fluid arrives by filtration through the veins of the venous circle in order to be removed from the eye. Iridectomy acts upon this pectineal ligament; is it not to be admitted that this division opens to the aqueous humor a direct access to the veins, and therefore accelerates the escape? That this increase of filtration takes place in the eye, whether the fluid here passes into the veins, or that this is the first of all by the cicatrix, in order to be taken up by the scleral and conjunctival vessels—all this is of slight importance from the point of view of the *filtrating* qualities w

cicatrices resulting from scleral incisions practised inomatous eyes.

erty has, furthermore, been demonstrated experimentally Ulrich, in 1880, in his article "Upon the Nutrient Eye" (*Græfe's Arch.*, Vol. XXVI., p. 59, and *Oculistique*, March and April, 1882), by his experiments on iridectomized rabbits, in which he injected ferropotassium (1).

one ever established the proportion of fluid which, under the circumstances, takes its way in the veins or under the conjunctiva? It is easy to take account of the number of encounters one encounters in elucidating this question of the proportion of fluid, either directly in the veins or under the conjunctiva, if we consider that even now it is not known whether the anterior chamber communicates with the venous system. In a recent work undertaken at the Institute of Berlin, and done at the instigation of Waldeyer by means of injections upon the eyes of cadavers of recently dead, Dr. Gutmann (*Græfe's Arch.*, Vol. XXVIII., 1895) arrived at this conclusion: "The nature of the canal of Schlemm has been variously interpreted; (*Arch. für mikroskop. Anatomie*, VI., 1876), classifying the canal of Schlemm as well as the vacuolar space at the angle of the iris in the lymphatic apparatus, an opinion which Waldeyer concurred without reserve in 1875 (Misch, I.), while Leber and his partisans interpreted it as a vascular venous plexus.

Waldeyer, in his treatise on the organ of sense, hardly sustained the lymphatic nature of the canal of Schlemm, since he speaks expressly of this canal

he considers," says Ulrich, "that at the point at which is situated the canal of the iris the intra-ocular current projects itself with more force and resistance, it results that the corneal cicatrix from the iridectomy is a cicatrix of filtration, a quality not due to the especial power of the cicatrix for the neighboring tissue is also found cicatricial), but to the fact that the processes endowed with secreting power, as well as the iris, are in more intimate relation with the vessels of the cicatricial or conjunctival and further, these researches demonstrate the existence of a centripetal fluid in the more superficial layers of the cornea."

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as a sanguineous venous space; and even Waldeyer holds the opinion expressed by him in 1875, "In making my injections, I have had occasion to talk with Professor Waldeyer upon the subject of this question. He has authorized me expressly to declare that he holds his opinion concerning the lymphatic nature of the sinus of Schlemm, which he believes to be of the nature of lymphatic vessels, and that he considers this sinus resting upon the level which exists between the bodies of Pacchioni and the sinus of the dura mater on the one hand, and between the vascular system of the marginal tissue and the sinus of the sclera on the other hand, as a venous sinus of the sclera. Consequently, at least so far as it concerns the human eye, it constitutes for the expression of Leber of venous circulation the name *sinus venosus scleræ Schlemmii*."

"It is to this same interpretation that Rochonot (1) also arrives, who considers this canal an endolymphatic space furnished with walls similar in structure to those of the dura mater. He also proposes, for this reason, the name of scleral sinus."

Incisions of the angle of the iris, which are almost always followed by escape of blood into the anterior chamber, also tend to plead in this direction.

That which I believe that I have also clinically demonstrated, and which Dr. Dianoux has confirmed, is that after an iridectomy or recent sclerotomy serves to force out of the conjunctiva a part of the aqueous humor, and that it may be the interpretation of the mode of filtration of the aqueous humor. It is equally well established that *every scleral cicatrization in a comatous eye (with exaggerated tension) facilitates the intra-ocular fluid, otherwise called filtration*.

The incontestable action of posterior sclerotomy or sclerectomy (Taylor, Parinaud), where the iris cannot intervene, has confirmed this interpretation, and I have

(1) The Angle of the Anterior Chamber and the Canal of Schlemm, *Bulletin of the Académie de Médecine of Paris*, 1892, and *Archives d'ophtalmologie*, Vol. XII., p. 732, 1893, pp. 20 and 108, 1893.)

see Dr. de Vincentiis adhere to an explanation of a of iridectomy which A. Weber (1) gave in 1887, a separation of the angle of the iris resulting from anism of iridectomy at the moment that the iris is for excision.

markable that a clinician so experienced as de Vin- could contest, in this regard, the anti-glaucomatous iridectomy practised where there are posterior sy- But who has not seen, in cases of irido-choroiditis with posterior synechia, and with the periphery of the iris forward, an excision, which could in no way influence under of the iris bound to the iridian angle, have a fest anti-glaucomatous action ?

ay in which the fluids of the eye escape from the not explained at the time when I spoke of filtration about by the operation of iridectomy. At that time re of fluids through the cornea was believed in. Now al filtration is generally admitted, and, as is seen er's last article (*Græfe's Arch.*, Vol. XLI., p. 235, is established in the following manner: "It is thus hat free communication between the anterior cham- the venous system does not exist in the anatomical that we have to consider in the angle of the anterior wo systems of lacunæ, separated from each other, but spaces are in the most intimate relation. It of ne- sults that the passage of fluid from the vascular sys- e space of Fontana, an annex of the anterior chamber, enous corona of Schlemm, and thence into branches om the anterior ciliary veins, can only take place—a reached from cases of accidental ruptures—by filtration."

also be allowed to recall that at the time when I spoke ablishment of a filtration cicatrix resulting from iri-

's *Archives*, Vol. XXXIII., p. 80. "The second factor," says Ad. regulating the mechanical conditions resides in the action of the iridec- traction exerted in seizing a portion of the iris and drawing it into the ds in a radiate direction from the point seized throughout the entire ipheral insertion and disengages the strangulation.

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dectomy a disturbance of equilibrium between secretion and excretion had not been thought of. At the present time, Leber, in the article above mentioned, concludes that "These observations (prolonged injections of Prus. *mammiferæ*) give new weight to the supposition that in the life the reduction of an increase of pressure produced by injection into the anterior chamber is brought about by *filtration* into the veins. Furthermore, it results that with a *normal* ocular pressure a filtration takes place which corresponds to the difference between the pressure in the anterior chamber and that of the derivative veins. As regards its quantity, it is not yet possible to give a definite answer; finally, that the *maintenance of normal pressure, as admitted up to the present time, depends on the equilibrium between secretion and filtration of the aqueous humor.*"

The disturbance of equilibrium between secretion and excretion, which in my opinion constitutes glaucoma as a *symptomatic affection*, finding its cure in a *re-establishment of this equilibrium* by means of greater facility of filtration by medication (myotics) or by an operation, thus receives confirmation a quarter of a century later from experimental anatomical, and physiological studies. Here again the fact is verified that empirical therapeutics has always been in advance of physiological science.

The operative cure of glaucoma is entirely based on the greater or less facility given to filtration of fluids by the production of a scleral cicatrix which will be the more favorable to filtrate filtration as cicatrization takes place under less pressure, so as to produce a more liberal suppuration of the scleral wound. Is it not a fact that the cure of glaucoma by iridectomy decreases in proportion as this operation is applied to eyes the pressure of which but slightly exceeds the physiological condition, as in the forms of simple chronic glaucoma, for in these cases inherent retraction of the scleral tissue may counterbalance the tendency to distention of the globe from the intra-ocular pressure here so slightly increased?

It is true that histological examination of cicatrix

eyes which have been subjected to iridectomy or, as well as experiments on animals, furnish, very but slight elucidations of the more or less pronounced quality of these cicatrices; but if an affirmative demonstration is wanting, on the other hand, histological investigations have amply established that to explain the cure of by iridectomy or sclerotomy it is impossible to admit of the iris, the tissue of which is found free or at the iridian angle, for numerous dissections of glaucomatous eyes have proved the complete integrity of the iridian attachment to the iris, and even, at times, the presence of a crowding back of the insertion of the iris.

To understand why my esteemed colleague de Vincentiis, in order to explain the mechanism of the action of iridectomy, to refute my theory of filtration, makes use of comparative statistics "with the object of establishing the equality of sclerotomy amounts to neither more nor less than iridectomy." Are we then to deny the curative action of iridectomy? On the other hand, have I ever claimed that iridectomy is the equivalent of iridectomy in its curative action? Recently, in a paper read before the Congress at Edinburgh (these *Annales*) on sclerotomy combined with iridectomy, I not only maintain that cicatrices toward which the aqueous humor current directly tends, as those produced by iridectomy combined with sclerotomy (and iridectomy), are the ideal anti-glaucomatous operation?

At present time, the therapeutic value of sclerotomy is questioned, and for the confirmation of its value it is necessary to claim its equality with iridectomy, although some ophthalmologists claim for it this equivalent therapeutic action, even from the fact that such an authority as Snellen, has spoken of it exclusively, and that a man standing so high in ophthalmology as Mauthner declared himself to the last an enthusiastic advocate of it. Evidently, that does not alter the question, which proves that theoretical reasoning (the predominance of the aqueous humor over excision in iridectomy) tends to an essentially negative result.

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"Everything considered," concludes de Vincentiis, "it seems to me that all this matter (the operation) has no other object but to raise upon the base of the sclera a pedestal upon which to erect a monument to sclerotomy, the discovery of which Wecker would attribute to himself, and of rejecting the operation which concerns iridectomy, which reposes upon the solid pedestal of experience."

A compatriot of Quaglini should not have accused de Vincentiis of the article "Quaglini and His Sclerotomy," which was published in these *Annales*, of any desire to attribute to Quaglini the discovery of sclerotomy. It would be difficult to do so. I first, in 1867, insisted that the scleral section, or excision of the iris, constituted the essential part in the cure of glaucoma; that it is as a result of this as of the first anterior sclerotomies were practised by Quaglini in 1868, by Quaglini in 1871, and by myself in 1872, and due to Quaglini, Mauthner, and myself that this operation has been brought into the current practice of ocular surgery.

But laying aside theoretical discussions, for it is not what is the idea of an operator as to the mode of performing the operation which he performs, provided it is successful. To operate, the cures of glaucoma were by thousands. No one could give an explanation, even slightly accurate, of an operation which was nevertheless held to be successful by sound theoretical reasoning.

From the point of view of practical utility, I agree with my colleague de Vincentiis unreservedly that the separation of the bands of the iridian angle, or internal sclerotomy, is favorable in all cases of disturbance of equilibrium of the ocular secretion and excretion, since this has the effect of restriction with relaxation, the same as in all the cases of excess of secretion demands a more abundant outflow of secreted products. The operation of which we shall give precise indications, and which, in view of its safety, has not yet been adopted, is still in the future. I freely accord to my colleague the merit of having first exclusively utilized the operation of the ordinary sclerotomy, and of having materially

ant thing—the opening of the eye to a simple punc-

inary sclerotomy thereby becomes an *internal* sclerotomy the equivalent of action of which remains to be tested, and has become an entirely safe operation. The absolute safety of internal sclerotomy can only be when its employment is restricted to eyes with deep anterior chamber. There is, therefore, immediately found a wide field of application. In the meantime, in the report of Dr. Taylor upon 62 cases in which the incision of the angle had been practised by Dr. de Vincentiis, he mentioned 3 cases of acute glaucoma and 18 cases of irritative glaucoma. I ask myself, how could these be executed in these cases, involving the disappearance or less complete, of the anterior chamber, for with Vincentiis himself I hold that his procedure cannot be in eyes in which the anterior chamber is greatly reduced. When Dr. Taylor also says, “I migliori risultati si ottengono nel glaucoma prodromico y di poi nell’ irritativo cronico semplice,” we may hardly subtract from the indications every irritative form of glaucoma, which usually accompanied by a pronounced reduction of the anterior

from the indications already established, for which I have already accounted, there are, after all, a too great number of operations, and one may with advantage restrict the internal division of the angle of the iris where it is possible to bring in great measure posterior filtration (papillary, or really peri-papillary) toward the peri-corneal zone of the iris at the same time that the ciliary muscle is divided.

It is to recognize in microscopical sections that internal sclerotomy acts especially upon the anterior insertion of the ciliary muscle, and that a section of the ciliary muscle is thus practised, as Hancock (1) was forced to realize soon after the discovery of Græfe, in making an anterior sclerotic

Division of the Ciliary Muscle in Glaucoma. (*Ophth. Hosp. Rep.*, No. 1, Oct., 1861, and *Ann. d'Ocul.*, Vol. XLIV., p. 47.)

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puncture, an operation also not without a reducing of the intra-ocular pressure, although the ciliary muscles are only involved in a radial sense and at an isolated point.

The indications for internal sclerotomy, still to be determined by many operations, are:

1st. Infantile glaucoma, buphthalmia. Here the advantage in restricting the opening made in the sclera to the minimum, especially in case of very young subjects, is not to incise the sclerotic too deeply, very thin in these subjects, in order to avoid extreme intra-ocular hemorrhages, which indeed, often occur spontaneously and lead to the destruction of the organ. Thus Dr. Taylor (*loc. cit.*) reports a case of operation for buphthalmia by Dr. de Vincentiis where a violent intra-ocular hemorrhage obliged our ophthalmologist and his colleague to proceed the next day (il giorno seguente) to the creation of a new opening. I have had also a similar case, but the evacuation of the blood six days after gave me an excellent result. It is, then, useful to make a more moderate opening in younger subjects; furthermore, by repeating the operation the incision may be carried throughout the entire circumference of the iridian angle.

2d. On the other hand, the cases on which I have recourse to try internal sclerotomy are those of progressive glaucoma in young persons which, even when it is but slight, may be an obstacle to a chosen career. Thus, the

(1) On this subject Dr. Rochon-Duvigneaud says, very apropos, in the treatment of glaucoma (*Gaz. des hôp.*, June 23, 1895): "The sclerotomy of Wecker, classically executed, often involves the formation of two little openings. It should be restricted to the *reduced sclerotomy*—that is to say, the entrance and the exit of the knife are restricted exactly to the puncture of the sclera without any enlargement of the two orifices. Internal sclerotomy from the reduced sclerotomy only in the suppression of the counter-puncture."

(2) This was a child, two years old, both of whose eyes I had operated on by repeated sclerotomies at the age of eight months. The corneæ, which had been cloudy, had completely cleared up, when, sixteen months later, the left eye became cloudy. The colleague who had formerly confided the child to me operated on it again, and I had the satisfaction of rendering the cornea perfectly clear by an internal sclerotomy which had to be followed by an evacuation of the blood.

didates to St. Cyr, the Polytechnique, the Naval Academy, who bring their children with a small amount of myopia to be examined, will find a veritable satisfaction if, by the use of an absolutely inoffensive in skilled hands, they may delay the progress of the myopia—something which neither hygienic cares nor operations to relieve the eye and free accommodation have, unfortunately, been able to accomplish up to the present time.

It is, then, in this direction, a laudable attempt to be made which is perfectly justified in young persons when the myopia has already reached so high a degree that in progressing it threatens detachment of the retina, and rendering the eyes with excessive myopia almost if not completely blind in a longer or shorter lapse of time—that is to say, myopia being greater than 20 dioptries, such dangerous operations as extraction or discission of the lens are at-

tempted in the case of progressive myopia by a surgical operation, a method with which von Græfe was so much occupied during the latter years of his life, is, then, a subject worthy of all our consideration and I think that we are justified in counting among the best for experimentation the absolutely inoffensive intervention applied by the new method of internal sclerotomy.

ALHOSCOPIE EXAMINATION OF HIGHLY MYOPIC EYES WITH THE INVERTED IMAGE

By Dr. **L. DEMICHERI,**

Chief of de Wecker's Clinic.

Alhalmoscopic examination with the inverted image apparatus is placed before the eye of the person to be examined in order to obtain a real and inverted image of the fundus of the eye. The enlargement, in this method of examination, depends upon the refractive power of the eye and the distance

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at which the lens is placed. When the anterior lens is made to coincide with the anterior focus of enlargement is always the same, whatever be the fraction (axillary myopia or hypermetropia) of the examination (1).

If the lens is carried still further away, so that it is beyond the anterior focus of the eye, the real image in this case changes its size and becomes smaller in axillary hypermetropia, and larger in eyes with axillary myopia, but the enlargement is of no importance. The

(1) Although the image obtained by the process which I shall describe follows the same rule as the real image of the ordinary process, seen in the following diagrams :

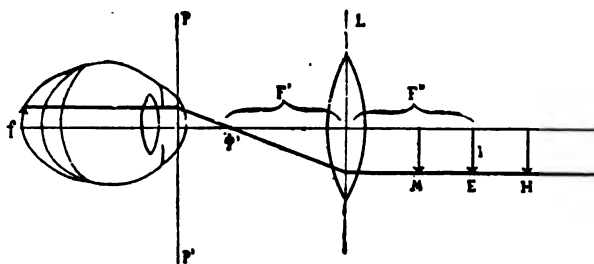


Fig. 1.

Giraud-Teulon Modification of the Principle of Badal's Optometer.— f , focus of the eye, which coincides with the anterior focus of the lens. f' , inverted image of the fundus of the eye (f), which will always have the same dimensions, whatever be the refraction of the eye.— PP' , anterior principal points.

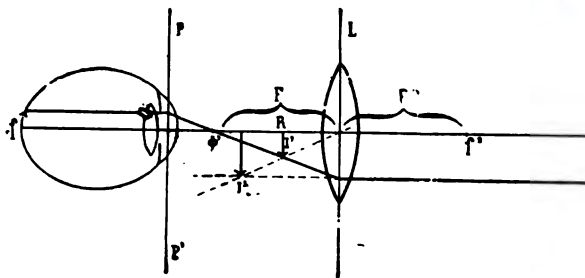


Fig. 2.

Φ' , anterior focus of the eye and anterior focus of the lens L .— f'' , virtual image of the fundus of the eye, which will always have the same size, whatever be the refraction of the eye.

myopia, the smaller is the visible image of the fundus

myopic eyes, then, have not, up to the present time, been favorable for minute examination, if we consider the image presented in the examination with the erect image. The reduction in the size of the image produced by the myopic eye.

That the inconveniences of the inverted image may be avoided if we examine with our ophthalmoscope, not the real image of the fundus of the eye, but a virtual image, which is very distinct, and which enables us to see all the details with accuracy approaching that of the real image.

The process which I shall describe is very simple, and requires only a lens and a mirror—that is to say, the most common form of ophthalmoscope.

If we wish to examine an eye with myopia of 20 dioptres, the remote point of which is, therefore, about 5 centimetres in front of the cornea. I employ for such an examination a concave mirror and a 12 dioptre lens (with focus of 8 centimetres). I first examine with the inverted image in the usual manner, but move the lens away from the eye, so that its distance shall be greater than the remote point of the eye. Naturally, the image of the fundus of the eye will be

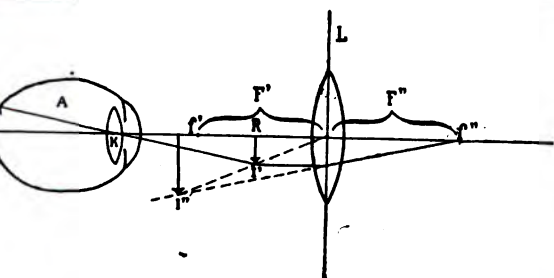


Fig. 3.

the fundus of the eye which is being examined or observed.

The inverted image of the fundus of the myopic eye A, situated at the remote point R, which in an eye with myopia of 20 dioptres is 5 centimetres in front of the principal point.

The 12 dioptres placed beyond the remote point of the eye. Its anterior focus is between the eye examined and the remote point R.

The image of the real image I', seen on looking from the other side of the lens.

between the nodal point and the focus of the lens, behind the mirror will see an enlarged and virtual

In general, when the lens is withdrawn to a great distance from the eye under examination, the observer must move back, in order that the image may not become diminished. In the method suggested the opposite is usually necessary. I wish to emphasize this point, because at first there is a tendency, from habit, to draw away from the patient at the same time that the lens is withdrawn. The virtual image obtained by this method is at some distance from the eye of the observer, so that, in order to bring the image nearer to the mirror must be made to approach the lens, and in some cases very close to it.

Naturally, the necessity for the greater or less distance of the mirror depends upon the refraction of the observer and the degree of accommodation which he employs. An observer by the aid of his accommodation, can see the image of the eye beyond his near point, whatever be the distance at which the virtual image is formed, as, if he did not accommodate, it would be necessary for him to draw away with the mirror from the lens. But I suppose that the observer employs his eyes as well to do, a small convex lens of 3 to 4 dioptries behind his mirror, a lens which enables him to relax his accommodation, and which enlarges the images. In this case the observer has rendered himself myopic, and must move back to approach the observed eye in order to obtain a clear view of the virtual image of the fundus of the eye. It is easily deduced, I always suppose, when there is a change of accommodation of the procedure, that the virtual image is not at an infinite distance. The focus of the lens should coincide with the remote point, but with the iris of the observed eye. That which we neglect from the point of view of the observer, the image is gained in the extent of the field of observation. Under these conditions, it is also well to turn the series of glasses of the ophthalmoscope until we render ourself myopic (for example, 10 dioptries). We may then move very near to the observed eye and see, as a result

very small distance—that is to say, under a very small distance.

which I employ in order to obtain a virtual image of the same significance as the ocular in a microscope. The more refracting power, the more also is the virtual image the precise opposite of that which happens in the examination with the inverted image. I prefer, however, to employ a lens different from that which is used in practice for the ophthalmoscopic examination ($+12$ D) so as to adjust the enlargement of the image to the possible extent of the field of observation. However, the refracting power may change, at will, the refracting power of the lens according to the greater or less degree of myopia.

When the eye is withdrawn from the eye, the enlargement obtained is augmented until the focus of the lens coincides with the remote point of the eye. In this case, as in every microscope, the image at the point of infinity is enlarged, and in order to see it, it is necessary that the observer be emmetropic, and that he employ no effort of accommodation. These conditions rarely present themselves in practice for the reasons already mentioned, and because it is necessary to remove the lens too far from the eye, the examination would be inconvenient, since the fingers of the observer would no longer have the support from the face of the person observed.

From the theoretical point of view, we may still add that in the examination with the inverted image of highly myopic eyes the lens placed between the eye and the mirror coincides with the far point of the eye, it has no influence upon the size of the image, while if its focus is beyond the remote point of the eye, the image becomes real, but erect, and at the other side of the eye.

In the ophthalmoscopic method one should consider three elements: *the enlargement of the images, the field of observation, the intensity and intensity of illumination.*

Of the procedure described, the dimensions of the virtual image are naturally greater than those of the real image which are obtained by the ordinary process with the in-

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verted image. They can be compared, in this regard, with the virtual image in the examination with the erect image.

As it may be easily deduced by calculation, the enlargement which this process gives is quite variable, according to the degree of myopia, the refracting power of our lens, and the distance at which the examination is made. In the case above chosen (myopia of 20 dioptries and lens of 12 dioptries placed at 5 centimetres in advance of the *punctum remotum*) the enlargement will be only 7, supposing that we use a lens of 4 dioptries placed behind the mirror, which would enable us to see the image at the distance of 25 centimetres, and thus to accommodate.

But if we examine a myope of 15 dioptries with a lens of 12 dioptries placed at 6 centimetres in advance of the *punctum remotum* of that eye, and with the same lens behind the mirror, the enlargement will be 14.8 (1)—that is to say, very different from the enlargement which is obtained with the erect image in an emmetropic eye. Moreover, if we cause the anterior lens to approach still nearer to the remote point of vision, the enlargement becomes considerably augmented.

(1) The enlargement of the aerial image situated at the remote point of vision of a myopic 15 dioptries is

$$\frac{I}{O} = \frac{72}{15.5} \quad (\text{I am guided in these figures by Dr. Tscherning's})$$

$$I = \frac{72 \times O}{15.5} = 4.7 \times O$$

The enlargement of the virtual image obtained when a lens of 12 dioptries is placed at 6 metres in front of the *punctum remotum* may be known from the following calculation:

$$\frac{1}{F} = \frac{1}{f^1} + \frac{1}{f^2}$$

$$\frac{1}{f^2} = \frac{1}{f^1} - \frac{1}{F} = \frac{1}{83} - \frac{1}{60} = -\frac{1}{216}$$

The virtual image is therefore at 216 millimetres behind the lens. If we now compare the value of the two images (the virtual image I' and the aerial image I) we shall obtain the absolute enlargement of the virtual image I'

$$\frac{I'}{I} = \frac{f^2}{f^1} = \frac{216}{60} = 3.6$$

$$I' = 3.6 \times I$$

$I' = 3.6 \times 4.7 \times O = 16.9 \times O$ —that is to say, the absolute enlargement of the object (the fundus of the eye).

of observation, nevertheless, does not diminish the amount at which this process gives. We know that the iris is the principal obstacle to the extension of the field of vision, and from this arises the necessity of making the border disappear by causing the focus of the lens to coincide with the pupil in such manner that the visual field is not limited by the aperture of the lens (1).

The method of examination with the inverted image, whether of the real or the virtual image, it is always the relation between the focus of the lens and the iris of the observed eye which substitutes the principal element for the enlargement of the field of observation. With two lenses of equal focus and the same diameter, the field of observation will have the same extent.

We prefer always to employ the ordinary lens (+ 12 dioptries) because it is very easy to withdraw it from the eye when the focus coincides with the pupil of the eye under examination. A stronger lens enlarges the image, it is true, but at the same time the lens must not be brought too near to the object, as then its focus falls in advance of the iris, and the field of observation will be limited by the pupillary border. The illumination of the fundus of the eye, a quality of great importance for the appreciation of details, especially of the disc (parts generally highly pigmented), it is not improved by withdrawing the lens from the eye, as may be seen in clinical practice. The withdrawal of the lens is compensated by the approach of the mirror, so that the conjugate

angular enlargement, which is the size of the virtual image seen at 25 centimetres compared to the size of the object seen without enlargement at the distance of distinct vision or *distance of projection* (which is admitted to be 22 centimetres in calculation with the erect image), we have only to compare the size of the virtual image seen at 25 centimetres.

$$\left(\frac{17}{250} - \frac{16.9 \times 0}{250} - \frac{0}{14.8} \right)$$

enlargement of the object seen at 22 centimetres $\left(\frac{0}{220} \right)$

= 14.8 (angular enlargement).

focus of the flame is always formed at about the same distance. From a practical standpoint, and in order that the lamp shall not be reproduced with perfect sharpness on the retina of the observed eye, but in diffusion circles, a lens of very high curvature should not be used. I have used a concave mirror of 20 centimetres focus, which is, in fact, frequently used in ordinary ophthalmoscopy.

In the various treatises on ophthalmology I have not found a description of the virtual image of the fundus of the eye which may be obtained by the method with the inverted lens. Dr. Schweigger has already called attention to this image, which exists between the lens and the *punctum remotum* of the eye, but without assigning to it much importance. The following is all that this author says in this connection: "If a myope of high degree is examined with a weak lens, it may happen that the image of the fundus of the eye is found between the eye and the convex glass. As the distance of the fundus of the eye is, in that case, very near the lens, there will only be a slight enlargement, but the image will be augmented in extent."

Schweigger does not say that the image of the fundus of the eye becomes virtual, although it cannot be otherwise. It is in the position of his lens. But I think that if this anomaly is given importance to the enlargement of the image, it is because he has employed a very weak lens and has placed it far enough from the eye. The distance of the fundus from the lens is very important, and I believe that the point of focus of the images is the point most worthy of attention in this procedure (2).

Consequently, if this manner of examination is new, at least no one has given to it practical importance.

(1) SCHWEIGGER: Handbuch der speciellen Augenheilkunde.

(2) After I had written these lines, Dr. Parent informed me that he had treated this question of the virtual images which may be obtained by the examination with the inverted image from the theoretical point of view in an article on astigmatism (*Recueil d'ophtalmologie*, 1881), Parent has also mentioned which may occur in the diagnosis of this anomaly of refraction when the image is placed beyond the *punctum remotum*.

at a procedure which so enlarges the images (3), is at the same time so simple, demanding no modification of ophthalmoscopes, but which requires only that the mirror be placed at distances slightly different from ordinary positions, is a process which deserves more attention.

When the eye may be withdrawn from the observed eye to a distance of 8 or 10 centimetres without removing the fingers from in front of the patient, it may be said that the virtual image is very easy to obtain in all persons whose myopia exceeds 10 dioptries.

Moreover, the difficulties encountered in examining small highly myopic eyes with the ophthalmoscope are well overcome by the method with the inverted image, which is always successful. It produces images too small. The method with the erect image requires the correction of the observer's eye with spectacles, which, in high degrees of myopia, must be much stronger than the real myopia, because they are placed too far from the eye; and when a perfect correction is obtained, illumination is then wanting, and imperfect illumination is imperfectly remedied in very pronounced ametropes, by using a convex mirror, as Dr. Masselon advises.

The usual method for observing the fundus of highly myopic eyes is to correct the anomaly of refraction by placing a concave glass before the affected eye and then making the observer look as though it were an emmetropic eye. But then the reflexes of the eye the reflexes of the anterior and posterior surfaces of the lens, and we are obliged to make the observation at a greater distance from the eye than usual, which greatly reduces the extent of the field of observation, consequently, almost always requires the use of a

mode of examination has, consequently, both the advantages of the erect image, the enlargement of the images, and of the ordinary procedure with the inverted image, from the extent of the field of observation.

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OBSERVATIONS

A RARE ENDO-BULBAR TUMOR (ENDOPHTHALMIC SARCOMA)

By Dr. O. PARISOTTI.

The tumor which I had the good fortune to observe, for it is the third case of the kind known to science, the first case observed, and published by Schleich in 1881, is described by Fuchs in his monograph of 1882 on "the Uveal Tract." The second was described by Dr. Unfortunately, the publication of this case does not contain a description of the patient, who was unknown. It was the examination of an anatomical specimen found in the laboratory of the ophthalmological clinic.

The following is a description of my patient :

A. C——, twenty-six years old, house painter. He had heard that his parents, his brothers, or his sisters had any diseases. Before the present affection, he had never had any trouble with his eyes.

The present trouble commenced in the right eye, as a slight hyperæmia, which lasted a month. Except smarting and some redness, the patient experienced nothing.

Four days after the hyperæmia had disappeared, on rising in the morning, that there was some haziness in the right eye. This haziness increased, and one of my colleagues at Rome was consulted, who prescribed collyrium of chlorate of quinine. The patient used this for two days, but the haziness decreased more and more, but without any suffering.

The function of this eye was now almost abolished. A colleague who was consulted made a diagnosis of optic atrophy and prescribed leeches to the temple. Some months later the perception of light was lost in this eye. The patient was of the opinion of nothing of the opinion given by two other colleagues.

(1) Lavori dell' Istituto di clinica oculistica della R. Università di

advised a seton in the neck, and the other, internal t.

egan to be intense in the month of April ; it was situated in the temporal and parietal region. In the latter part of 1894, the patient came to my public clinic.

The eye was decidedly hyperæmic, the anterior chamber was shallow, the pupil moderately dilated and immovable, and the vision of the eye greatly increased. On ophthalmoscopic examination, I found total detachment of the retina.

Concerning the manner in which the disease had developed, its duration, and the violence of the glaucomatous symptoms, did not allow me to consider that this inflammation was simply the result of a detachment of the retina. The idea of an endocular tumor occurred to me, and my colleagues, Businelli and Dantone, and I sent the patient for consultation, agreed with me. In deciding to enucleate the eye, I proposed an iridectomy to relieve the glaucomatous symptoms in case our fears were not justified. From that time the patient experienced a remission of his sufferings, and did not come to me again until the latter part of June.

His pain had then become insupportable, and the patient was in a miserable condition. Phenacetine internally, and sub-cutaneous injections of morphine, had no effect on his sufferings. The vision of the eye was somewhat changed. The anterior chamber was abolished, and through the clouded cornea the iris could be seen somewhat retracted and completely adherent to the anterior surface of the lens. There was intense peri-ocular injection. From the border of the cornea toward the center was a grayish circle of infiltration half a millimetre in diameter. The fundus of the eye was absolutely indistinguishable. The vision was enormous.

Enucleation was performed July 4.

As it was enucleated, the eye was cut in two in the vertical posterior axis. A very thin fluid escaped, yellowish in color, much like ascites fluid. The retina was completely detached. No tumor was at first seen. The posterior half of the eyeball was very thick, and on careful examination two tumors were noticed: one external, of the color and thick-

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ness of the normal sclera; the other, of a yellowish-gray color. The section in this portion had almost the same color as the surface.

In front, near the equator, this mass, which was everywhere intimately adherent to the sclera, terminated in a bevel. Immediately in front was a normal portion of choroid, which was free from all adhesions. Near the ora serrata, the choroid was covered with a substance which formed a gray ring. On examining this ring with a lens it was seen that the surface was finely ribbed and scattered over with little rounded reliefs of a yellowish color.

This case, which is rare, is rare from several points of view. In Dr. Taylor's case the disease was very far advanced; in this, on the other hand, we had in the same specimen the commencement and the complete development of the lesion. The interest in this case is still greater from the fact that in the latter part of last year, after noticing pain in the temporal and parietal regions of the other side, the patient noticed considerable haziness in the left eye. Ophthalmoscopic examination was as follows:

The papilla was surrounded by a number of white plaques, which occupied the posterior pole. The vessels could scarcely be seen, on account of large hemorrhages, which formed a contrast to the above-mentioned white plaques. It was not difficult to see that these plaques were slightly in relief, and they could not be confounded with degenerated hemorrhages. Several of the latter were also found.

It is well to consider this examination in connection with the anatomical examination of the enucleated eye, for it seems to me that it may be said that the ophthalmological appearance represents what in the enucleated eye is the stratified mass at its posterior pole.

The patient is now about to succumb to cerebral lesions, which puts beyond discussion the malignant nature of the tumor.

Histological examination of the enucleated eye gave the following result in five portions which were taken at different points of the eyeball:

First Series.—The sections were taken from a portion in the thickest part of the tumor, and included the sclera.

The internal limit of the tumor was shown by a band of pigment. There was no character which permitted me to say that the pigmented elements forming this band were pigmented epithelial cells. These elements had very different forms; generally, they were in the state of degeneration. Other cells, which contained pigment, and whose form could be distinguished, were like the cells of the tumor, but they were much altered by the pigment.

In immediate contact with the sclera, in a space which could be regarded as the supra-choroidal space, it could be clearly seen that the pigmented elements were the fixed cells of the choroid.

The mass of the tumor was shut in by a network of fibrous tissue, the strands of which, different in form and size, generally assumed the direction of the meridians of the eyeball.

The contents of the meshes were composed of cells crowded against each other, and all of a similar type—that of endothelium.

These cellular globes or cylinders were generally separated from their proper wall by a small free space.

The cells, for the most part, were in the form of thin plates, but there were some which were very large, with a large nucleus, and one of more nucleoli, which was generally deeply stained with hematoxyline.

The borders of some of the cells were undulate. In the connective tissue partitions, islands of endothelial cells were formed, composed, at times, of only one or two cells.

The portion nearest the sclera was composed of cells which also were of endothelial type, but which were much smaller than those contained in the meshes of the tumor. The quantity of cells here was so great that their form could be considered as the result of reciprocal compression. Here also were seen in several sections the commencement of the formation of islands of cells, and of the fibrous cords which surround them.

The pigment was found in greatest abundance at the internal limit of the tumor, in the place of the pigmented epithelium. The epithelial cells were degenerated. In points where the pigment was less thick, scattered cells could be seen, and the pigment in little irregular granulations. In cells which still had a nucleus, the latter preserved the pigment better than the protoplasm.

Of the elements which composed the alveoli of the tumor there were very few which contained pigment, and it was then in the nu-

cleus, in the form of very fine granulations. A few vessels were seen of considerable size in the more internal layers immediately beneath the pigmented epithelium, and at the side where the tumor was in the first stage of invasion.

The *second series* was composed of sections of a portion of the choroid near the ora serrata covered by the grayish layer, which was mentioned above in the macroscopical examination. This series was the most important of all. It was seen, in fact, that this grayish layer was nothing more than the first invasion of the tumor.

Under the microscope it was seen that this layer was formed of crowded cells, making a relief the thickness of which was not everywhere the same.

The cells were of variable size and form, but they were of the endothelial type. With this cellular proliferation there was in the subjacent choroid an infiltration of small cells. Some of these cells had already reached the layer of pigment epithelium.

In some parts the new-formed mass had internally a border which could be seen to be formed of altered pigment epithelium cells.

In some parts of this series partitions could be seen formed in the pigment epithelium, which was thickened. There were portions of this newly formed mass in which very thin vessels abounded, so that the tissue was almost exclusively composed of them, and to judge only by these portions, one would have thought it was cavernous tissue.

Among the cells which infiltrated the subjacent choroid some were found which were of endothelial type.

The walls of a number of the vessels of the chorio-capillaris were thickened, or there was cellular infiltration about them.

The *third series* included a portion of the disc and its adjoining portion.

The tumor had already commenced to invade the disc and the optic nerve. The border of the disc was filled with numerous large cells with large nuclei, generally elliptical. Some groups of cells were already surrounded with a halo of connective tissue. The nuclei of the connective tissue of the optic nerve were much increased. In the connective tissue framework was already seen the formation of islands of endothelial cells contained in partitions of connective tissue.

Fourth Series.—The portion of the retina in continuation with the disc.

The portion of the retina immediately in contact with the disc was quite well preserved. Further forward it was transformed into con-

nective tissue, which was not well stained with carmine. Near a vessel, but without any connection with it, was seen a small mass of cells with large nuclei, some with two nuclei, and all of the endothelial form. There were some which were contained in a vacuole—what might be called a typical commencing foci of the tumor. There was cystic degeneration of the retina.

Fifth Series.—The choroid adjoining the tumor.

An island of endothelial cells contained in a cavity with very thin walls formed in the substance of the pigment epithelium. Everywhere in the chorio-capillaris there was abundant cellular infiltration.

Sixth Series.—A section including the anterior pole of the eye and back to the equator. The inflammatory lesions were here predominant. There was abundant cellular infiltration, which had, however, not attacked the peri-corneal lymphatic canals.

There were some changes in the iris. The endothelium had disappeared in several parts, and was replaced by a thick layer of a substance which was not colored with carmine, and was homogeneous in appearance, but which on higher magnification was seen to be formed of a finely fibrillary tissue. This substance also filled the physiological crypt of the iris. A very thin layer of the same substance also covered the endothelium where it was normal. There was adhesion of the inner periphery of the iris with the surface of the lens by means of a distinctly fibrillary substance in large layers, which was colored a pale rose with carmine, and which had a few scattered nuclei. The layer of nuclei near the small circle showed evident increase in the nuclei.

A fact observed in all parts of the tumor, but more especially in portions in which it had reached complete development, was the hyaline degeneration of the cells contained in the partitions.

Other traces of degeneration were seen, such as hyaline globes, which were, however, very small in quantity.

This hyaline degeneration corresponded to the poverty in vessels, which, in the completely developed portions of the tumor, rarely appeared in the connective tissue partitions.

The passage of the tumor into the sclerotic was made by a mass of cutaneous cells in the sub-choroidal space. In the parts where the tumor was furthest advanced, tumor and sclera were blended, and in some parts it was difficult to tell which was tumor and which sclera.

I will now consider a question which does not belong to ophthalmology, but rather to general pathology.

Is endothelial sarcoma, or endothelioma—for I do not think that this distinction should be preserved—a true cancer produced by proliferation of pavement epithelium (Neeken-Ziegler), or is the origin of the tumor in the endothelium of the blood vessels or lymphatics? This question is very difficult to decide, and my observations cannot be of much assistance.

I have nowhere found karyokinetic figures at the expense of the endothelial cells of the blood vessels or of the lymphatics, but this is not a sufficient argument to deny this origin.

What I can say from this case is that the tumor did not commence in the substance of the choroid, but within that and in the pigment epithelium.

But this fact is not sufficient to state that the origin of the tumor was not in the choroid. The elements of the tumor were formed in the latter by proliferation of endothelial elements which had pre-existed there, and which traversed the pigment epithelium and formed on that the gray layer which covered it in several parts, and which was the first invasion of the tumor.

The autopsy should give us further information on the nature of the disease, and inform us whether the process going on without doubt in the cranial cavity and in the other eye is a true metastasis, or rather a propagation by continuity, and also whether the tumor in the eye is a reproduction of a tumor existing in some other organ.

I think, until proved to the contrary, that there is simply a propagation of the tumor by continuity into the cranium, and that the ocular tumor is not a metastasis from a tumor which exists in some other organ.

II.—REPORTS OF SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of July 5.

Association of Certain Forms of Myopia with Nasal and Pharyngeal Affections.

MR. BATTEN described a special form of myopia associated with certain affections of the nose and of the pharynx. The principal characteristics of this form of myopia are the existence of a posterior staphyloma located in the immediate vicinity of the optic disc or at the nasal side of the retina, the traction of the optic papilla in the direction of the staphyloma, and œdema of the most prominent part of the optic disc.

This œdema or false neuritis is regarded as secondary and allied to the deformation of the optic papilla.

The nasal and pharyngeal affections associated with this myopia are: amygdaline hypertrophy, adenoid vegetations, deviation of the septum, ozæna, syphilitic lesions of the nasal bones, and chronic otorrhœa.

In certain cases the myopia supervenes immediately upon the appearance of the nasal or pharyngeal trouble. The presence of œdema indicates that the nasal or pharyngeal processes are at an acute stage. The visual acuity has been found especially reduced when the staphyloma is situated at the nasal side of the optic disc. The œdema has a tendency to disappear with the progress of the myopia.

The Chairman remarked that attacks of scarlet fever and of rheumatism were often followed by myopia, or induced an increase of it. Mr. Batten has passed by these facts, but do they not play a certain rôle in the cases mentioned?

Mr. Spencer Watson does not think that the condition mentioned by Mr. Batten and these constitutional conditions should be included in the discussion. He had observed an interstitial keratitis in the course of which myopia developed.

Instruments of Indian Oculists.

MR. FROST presented a complete equipment of instruments em-

ployed by East Indians, and described their methods of operating. There is neither antiseptis nor asepsis, and in extractions of cataract the majority result in panophthalmia or glaucoma.

ACADEMY OF MEDICINE

Session of July 16.

Disorganization of the Vitreous, Electrolysis, Recovery of Vision.

DR. ABADIE.—The case was that of a man the vitreous body of whose eyes had been disorganized as a result of intra-ocular hemorrhages eight months previously. There was only quantitative perception of light. I penetrated the eye by a fine needle of platinum-iridium 8 millimetres long. This needle was placed in contact with the positive pole of a continuous current apparatus, the negative pole of which was applied to the arm. Then, during five minutes, a current of 3 or 4 milliampères was passed. The following day the patient commenced to count fingers, and the fundus of the eye, up to that time quite obscure, was capable of being illuminated by the ophthalmoscope.

During the month since the operation was done there has been a gradual improvement. The patient goes about alone. He sees the names of the streets and the numbers of the houses. The right eye, which has not been treated, remains in the former state—that is to say, without qualitative perception, the vitreous being clouded and opaque.

Since the treatment of this case I have also treated another case in which the conditions were analogous, the vitreous having been disorganized by successive hemorrhages. Like the other, it was cured.

BELGIAN ACADEMY OF MEDICINE

**Upon the Experimental Production of Amaurosis by
Ethereal Extract of Male Fern.**

DR. MASIUS.—I have recognized two cases of amaurosis more or less complete following the administration of the ethereal extract of male fern in doses of from 8 to 10 grammes, given several days in succession to persons suffering from tapeworm.

For the purpose of learning whether the amaurosis was due to the extreme anæmia caused by the intestinal worms or by the medicine prescribed, I instituted experiments upon dogs. Of four animals to whom was given the ethereal extract of male fern, two, after a little time, presented manifest signs of blindness.

It is established, then, that amauroses which are sometimes observed after the employment of the ethereal extract of male fern are due to the absorption of the toxic principles contained in the preparation.

Dr. von Auel.—It is interesting to recollect, in connection with the communication of Dr. Masius, Gerhardt's observations calling attention to the occurrence of amaurosis following the administration of 10 to 15 grammes of ethereal extract of male fern. Eichhorst, in his treatise on internal pathology, also speaks of it, and in order to avoid it, recommends that castor oil be taken at the same time with it, and that enemata be administered.

Poulson (Strasbourg) has just demonstrated that among the products obtained from the male fern (flicic acid crystallized and amorphous flicic acid, volatile essential oils and resins), the crystallized flicic acid has neither any tæniifuge nor toxic power, while the amorphous flicic acid possesses both to a high degree (1).

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX

Session of June 14.

Dislocation of the Lens into the Vitreous ; Extraction.

DR. LAGRANGE.—The case was one in which the lens, affected with over-ripe cataract, had, under the influence of a traumatism,

This case resembles one recently reported by Grosz (Budapest). (See these *Annales*, Vol. CXIII., p. 207.)

been dislocated into the vitreous humor. A cyclitis, with acute pains, photophobia, etc., had resulted.

The lens was visible behind the iris and below.

Although the operation was done a year after the commencement of these cyclitic accidents, I was able to extract the lens very simply, and without iridectomy, by an inferior keratotomy. Not a drop of the vitreous humor escaped. At the present time, two and a half months since the operation, the visual acuity with glasses + 11 and + 15 equals unity. The cure is absolutely perfect.

In order to succeed easily with this operation, reputed so full of accidents, the incision should be made at the point of the cornea nearest to the border of the dislocated lens, and the eye should be placed in such a way that the vitreous humor, as it presses into the corneal opening, should push the lens before it. The incision of the cornea should be large enough to allow the lens to escape, but it should be made slowly; as the aqueous humor escapes, the lens is seen to advance, as though carried by the current, toward the door of exit.

Session of June 28.

Pigmentary Nævus of the Conjunctiva.

DR. ARMAIGNAC.—This is a case of congenital pigmentary nævus, quite large and somewhat prominent, deep chestnut color, situated upon the internal sclero-corneal border of the left eye, and nearly covering the internal third of the cornea. The presence of the nævus induced no astigmatic deformation of the cornea.

I have observed in public practice several cases of congenital nævus of the eye, but they were always situated upon the ocular or oculo-palpebral conjunctiva. I have never seen them develop upon the cornea, and have found no analogous observation in ophthalmological literature.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Albrecht von Graefe's Archiv für Ophthalmologie

Reviewed by Dr. V. MORAX.

Vol. XLI., No. 1, April, 1895.

I.—On the Perceptive Layer of the Retina in Man, by Dr. W. KOSTER.

In a communication to the Berlin Academy of Sciences, Koenig and Zumft maintained that waves of light of different wave lengths were

perceived in different layers of the retina. The experiment which led them to this conclusion consisted in the production of double images of the retinal vessels. For this purpose, Purkinje's experiment was performed by causing the light to pass through a screen perforated with two openings, which was placed in the anterior focus of the eye, and which was made to execute very slight movements of displacement. In this way two images of the retinal vessels are obtained, and, according to Koenig and Zumft, the distance between the two images will differ according to the color of the light used.

Leber and Koster did not succeed in reproducing this experiment. On the contrary, by projecting the shadow of the retinal vessels upon a screen one-half of which was red and the other blue, they came to the conclusion that the rapidity of the parallax displacement of the image in the two colored halves was the same, and that, consequently, the conclusion of Koenig and Zumft could not be accepted. In their opinion, these facts do not contradict the Young-Helmholtz theory, but Koster remarks that, as they found four different layers for the perception of different colors, their claim is hardly in accord with the Young-Helmholtz theory, which only includes three.

II.—On the Nature of the Canal of Schlemm and Its Connection with the Anterior Chamber, by Dr. GUTMANN.

Gutmann injected solutions of Prussian blue or India ink into the anterior chamber of eyes of human and animal (monkeys) cadavers. The injection was made under a pressure varying between 20 and 30 millimetres of mercury, and equal, therefore, to that of the aqueous humor under normal conditions. Under these circumstances, by making microscopical sections of hardened specimens, he was able to show that the injected substance had penetrated into the canal of Schlemm, and even into the scleral veins.

The author considers the communication of the anterior chamber with the canal of Schlemm and the scleral veins as demonstrated, an opinion sustained by Schwalbe, Heistrath, Gifford, etc. The canal of Schlemm is a venous and not a lymphatic sinus, as Schwalbe and Waldeyer formerly supposed.

III.—Experimental Researches on Ulcer of the Cornea Produced by Staphylococci, and Its Treatment, by Dr. L. BACH.

Sub-conjunctival injections of sublimate have been recommended for numerous affections, among others for infectious processes of the eye. Bach has endeavored to demonstrate experimentally the effi-

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ciency of these injections. With this in view, he inoculated rabbits by introducing a small lance charged with staphylococci between the corneal lamellæ at the centre of the cornea. Both eyes were simultaneously inoculated: one of them was treated simply with instillations of atropine; the other received, in addition to the instillations, sub-conjunctival injections of sublimate, following the technique laid down by Darier. In forty experiments the therapeutic results were negative. Indeed, the reactionary phenomena were more intense, and lasted longer. Bach then endeavored to discover whether, in the case of corneal ulcer produced by staphylococci, the micro-organisms penetrated to the deep membranes of the eye. For this purpose, he made microscopical examinations and cultures of the aqueous humor, the iris, and the hypopyon. He found that as long as the cornea was not perforated there were no micro-organisms in the interior of the eye, even in the hypopyon. His investigations on the origin of the hypopyon proved that it is the result of exudation of fibrin and leucocytes, arising from the iris and the ciliary body. This exudation is caused by diffusion of microbial products into the eye, and not by penetration of the micro-organisms themselves.

The author then tried to find mercury, by Ludwig's method, which detects quantities of mercury to 0.00002 gr. He did not succeed in finding a trace of mercury in the eye.

He also endeavored to account for the effect of irrigations of sublimate, $\frac{1}{1000}$, repeated every two hours, in the treatment of *ulcus serpens*. He found that in an ulcerated cornea the sublimate penetrates in traces, while penetration does not occur in healthy corneæ after bathing five minutes with the solution.

If a corneal ulcer is produced experimentally by staphylococci, and it is treated with a solution of sublimate, one may succeed but exceptionally in destroying all the micro-organisms. Again, the solution should be 1 to 1,000, the contact should continue five minutes, and the effect is only obtained at the price of a severe conjunctival inflammation. The same is true of oxycyanide of mercury, trichloride of iodine, and pyoctanine.

Bach has settled upon the following treatment for corneal ulcers: The eye is bandaged, six to eight drops of atropine are instilled daily, the culs-de-sac are cleansed with the physiological solution of chloroid of sodium, and, if the ulceration progresses, the borders of the ulcer are lightly touched with the galvano-cautery. If there is hypopyon without tendency to reabsorption, the cornea is punctured to evacuate it. This puncture is made peripherally, 1 millimetre

to the inner side of the corneal border. These punctures may be repeated.

After this clinical digression, Bach returns to the results of his experiments. In his opinion, phagocytosis is not found in corneal ulcers produced by staphylococci in the rabbit. The cocci are not found in leucocytes whose nuclei are not stained, and which are, therefore, dead. He thinks that the leucocytes secrete a ferment which prevents the development of the cocci.

IV.—On Tubercular Iritis and Parenchymatous Keratitis, by Dr. O. BURSTENBINDER.

Bürstenbinder describes several cases of presumed ocular tuberculosis seen at the clinic at Jena.

Case I.—A girl, nine years old, who at the age of three years had had tuberculosis of the knee-joint. For six years the affection seemed to be cured, when a new attack occurred in the same joint, accompanied by headaches. Five months after this recurrence, there appeared symptoms of meningitis without fever, and several days afterward both eyes were affected with iritis with fibrinous exudate and slight disturbances of the vitreous. All these symptoms disappeared after some time, and recovery has remained permanent. In spite of the absence of miliary granules in the iris, the author states that this was tubercular iritis, and that the bacilli, dispersed by the vessels, were simultaneously localized in the meninges and the iris.

No former history was found permitting the inflammations to be attributed to a mixed infection or any other disease.

Case II.—A girl, fifteen years old, who had traces of a phalangeal osteitis of infancy, head disturbances, and arthritis of the knee, was attacked with diffuse parenchymatous keratitis with iritis. At the irido-corneal angle were found several small gray nodules which disappeared in a few weeks. The affection recovered completely in from four to five months, and its progress was absolutely identical with that of the interstitial keratitis of hereditary syphilis. One may well ask whether Bürstenbinder's etiological diagnosis is quite correct: it is, in fact, only based on the presence, at a given time, of small gray nodules in the iris and on the absence of avowed hereditary syphilitic history. The author does not mention the condition of the teeth or the hearing. As for the phalangeal osteitis, it is known that it may also be of syphilitic origin, and we cannot consider this case as quite demonstrative.

Case III.—A youth, seventeen years old, with no hereditary or acquired syphilitic history. The ocular affection was character-

ized by a parenchymatous and diffuse disturbance of the cornea, with iritis which seemed to have lasted for two years. The appearance in the iris of small nodular lesions led to the diagnosis of tuberculosis, although there were no other tubercular manifestations. The patient was lost sight of.

Case IV.—A woman twenty-eight years old, attacked with commencing pulmonary tuberculosis. The ocular disturbance had started with episcleritis and triangular infiltrations at the lower periphery of the corneal parenchyma, and was accompanied with iritis and precipitates on the posterior surface of the cornea. The vitreous was cloudy. These troubles disappeared progressively after a duration of four months.

V.—A Case of Gummosis Lesion of the Papilla,
by Dr. SCHEIDMANN.

This is a commonplace observation of a specific lesion of the optic nerve appearing six months after the primitive affection. The article is accompanied by the German bibliography of the subject.

VI.—A Case of Variolar Lesion Located on the Conjunctiva,
by Dr. WAGENMANN.

The case of a Sister of Charity who in caring for a person with variola received some of the water from the bath of the patient upon the conjunctiva.

After an incubation of six days, there appeared upon the tarsal conjunctiva of the lower lid two white patches of the size of the head of a pin. The surface of these was not depressed or ulcerated, and resembled a diphtheritic lesion. At the corresponding point of the bulbar conjunctiva there was also seen a small ulceration. The conjunctiva was injected, and the lids slightly swollen. There were no corneal lesions. There was but slight subjective trouble, and no cutaneous eruption. Four days after the commencement, the lesions began to be reduced and the patient had a slight fever, without very general trouble. The cure was not complete until the twelfth day.

Wagenmann thinks that it was a case of varioloid, mitigated from the effect of vaccination. The last vaccination, the result of which had been negative, had been done some days before the contamination.

VII.—On the Increase of Visual Acuity by Operative Treatment in Myopia of High Degree, by Dr. FR. SCHANK.

Nearly all operators have found an increase of visual power by the operative treatment of extreme myopia. The explanation of this

improvement has not been completely given. Fukala thinks that it is due solely to the fact that the retinal image is three times larger in aphakia than with the correction of the myopia. But calculation shows that in case of emmetropia obtained by producing aphakia in myopia the size of the image is only one-half more than in case of correction. But what in addition influences the amelioration of vision is partly the increase of luminous intensity and partly the diminution of diffusion.

VIII.—Contribution to the Study of Mucous Cysts and Vascular Tumors of the Orbit, by Dr. H. BECKER.

Becker publishes some interesting observations gathered from the clinic of Professor Uhthoff.

Case I.—Mucous Cyst of the Orbit.—The case was that of a woman nineteen years of age, who, when one year old, fell from her cradle and received a slight orbital concussion. A short time after, the mother noticed a small swelling in the contused region (the internal angle). At seven years of age this swelling had reached the size of a pea. For two years its volume had increased so that it was as large as a nut. It had no connection with the lachrymal ducts, rested against the orbital wall, and its consistency was elastic and fluctuating. The cyst caused no subjective disturbance. It was situated at the junction of the lachrymal frontal and ethmoid bones.

Extirpation of the cyst showed that it was prolonged backward along the internal wall; it could not be completely removed without incising it. A transparent, gelatinous fluid which contained no solid particles escaped from it. No direct communication with the nasal cavity could be found, but in later irrigations with sublimate or methyl blue it was evident that part of the liquid passed into the nose. After several months, the fistulous orifice corresponding to the point of incision of the cyst was obliterated, leaving a depressed cicatrix. The cyst wall was covered with stratified cylindrical epithelium which rested on fibrillary connective tissue containing vessels and cells.

Becker states that in this case, as in that published by Panas, the cyst was formed by strangulation of the nasal mucous membrane during foetal life.

These mucous cysts are to be diagnosed from palpebral cysts accompanying microphthalmia, encephalocele, cysticercus and echinococcus cysts, dermoid cysts, hematic cysts, pigmented cysts, and cysts arising from a serous bursa of the orbit. The treatment should be surgical. Thompson has had success with electrolysis. Spencer

Watson has seen spontaneous recovery in one case. The prognosis of orbital cysts should be given with prudence, since cases of death after operative interference have been published.

Case II.—Periodic Exophthalmus from Varicose Dilatation of the Orbital Veins.—This was the case of a youth eighteen years old who had been treated with Koch's tuberculine for pulmonary tuberculosis, and who, after an injection of tuberculine, had severe pains in the right eye. At the same time, exophthalmus appeared on this side, with slight ptosis, and movements of the eyeball were limited and painful in all directions.

The patient had vertigo, prostration, and repeated vomiting. On the next day all these symptoms had disappeared, but they reappeared eight days afterwards accompanied with the same cerebral phenomena. Ophthalmoscopic examination showed that the retinal veins were dilated and sinuous. There was no pulsation. The left eye was normal. On the same day it was noticed that there was slight ecchymotic coloring of the lower lid. The following days the protrusion of the eyeball diminished, but it increased when the patient lowered his head. Later, according to the patient's statement, the exophthalmus was produced during the effort of defecation. Pressure on the jugular and flexion of the head provoked exophthalmus, but it was exaggerated on pressure of both internal jugular veins.

Becker explains the production of these symptoms by the appearance of a retrobulbar hemorrhage following varicose dilatation of the orbital veins. These hemorrhages caused the cerebral disturbances, and in part also the exophthalmus, as was shown by the ecchymosis of the lower lid. Since the hemorrhages are no longer produced, the cerebral symptoms have disappeared, and there remain only the varicose dilatations of the veins which, under certain conditions, cause exophthalmus.

Becker then gives a complete review of medical literature on intermittent exophthalmus (23 cases).

Case III.—He reports another case, concerning a woman fifty-one years old, who, from infancy, had had varicose dilatations of the facial and palpebral veins, and in whom the mechanism of varicose dilatation, which, in the case of exophthalmus, occurs in the orbit, could be easily studied. Pressure on the jugulars, flexion of the head, and efforts caused the facial varicosities to become prominent.

Case IV.—Cavernous Angioma of the Right Lower Lid.—A woman fifty years old, affected for two years with a tumor the size of a pea, situated below the internal angle of the lids on the right side, which

did not disappear on pressure and caused no disturbance. This tumor had grown quite rapidly during the last few months. It was easily extirpated by the cutaneous opening, and histological examination showed that it was a cavernous angioma, surrounded by a resistant fibrinous capsule, which explained why the tumor had not increased under the influence of the venous stasis caused by compression of the jugulars or flexion of the head.

IX.—On a Modification of Resection of the Optic Nerve in Case of Danger of Sympathetic Inflammation, by Dr. A. WAGENMANN.

Section and resection of the optic nerve have not prevented sympathetic accidents from occurring. Wagenmann thinks that cauterization of the extremity of the optic nerve with the thermo-cautery should be preferred to them when the patient refuses enucleation, and when the risks of sympathetic ophthalmia are to be feared. Wagenmann has twice performed this operation, the technique of which is most simple. The conjunctiva is incised in the internal angle, and the tendon of the internal rectus incompletely sectioned; with scissors, the optic nerve is cut a little behind, the eyeball is turned so as to bring its posterior pole into the wound, and then, with the thermo-cautery, the entire bulbar extremity of the optic nerve is cauterized; then the tendon of the cut muscle is sutured.

X.—On the Relations of Acromegalia to Ocular Affections, by Dr. E. HERTEL.

The author reviews the ocular manifestations of acromegalia, and reports the ophthalmic examination of a patient.

Among the ocular disturbances are noticed a thickening of the lids, prominence of the orbital borders, and exophthalmus. In a case of unilateral acromegalia, Burchard found a more marked development of the eyeball on the diseased side. The corneal diameter was 1 millimetre larger on this side.

The disturbances of the nervous apparatus may consist of painful peri-orbital phenomena and lachrymal hypersecretion. In some cases have been noted nystagmus, limitation of movements, paresis of the common oculo-motor with slight ptosis, insufficiency of convergence. Ophthalmoplegia interna is shown by the frequent pupillary disturbances observed.

The sixth nerve has never been affected. Hertel thinks that this is due to the hypertrophy of the pituitary body which contains the nucleus of the third nerve, and does not affect the sixth. The optic nerve has been found diseased in 73% of the cases.

Optic neuritis followed by atrophy or simple atrophy constitutes the most frequent alterations.

The lesions of the optic nerve are also explained by the hypertrophy of the hypophysis.

Narrowing of the visual field, notably in the temporal portion, has been found in thirteen cases. The case observed at the clinic in Jena was that of a man thirty-one years old, with indisputable acromegalia. The ocular disturbances consisted in a thickening of the soft parts, a small degree of exophthalmus, narrowing of the palpebral opening, and a small amount of ptosis and a slight degree of divergent strabismus. No pupillary disturbances. Double temporal hemianopsia with narrowing of the visual field and considerable reduction of acuity; simple papillary atrophy. No investigation was made as to whether there was hemiopic reaction of the pupil.

The description of the case is accompanied with measurements of the patient, and the article is followed by the complete bibliography on the subject.

XI.—A Case of Tubercular Parenchymatous Keratitis,
by Dr. W. ZIMMERMANN.

Cases of tubercular keratitis of parenchymatous form controlled by anatomical examination are still few in number. Michel, Bach, and Bürstenbinder have described clinical cases. Bougartz has described histological lesions in cases of ocular tuberculosis where the corneal alterations consisted in infiltration and interstitial vascularization, and in which the disturbance of the cornea was the result of tuberculosis of the eyeball. In the case of V. Hippel, the disease developed like ordinary parenchymatous keratitis. Histological examination revealed the presence of nodular lesions with giant cells in the sclera, the choroid, and the cornea. But the diagnosis of tuberculosis does not rest on a histological examination, and is not corroborated by a search for bacilli or inoculation.

The case so carefully studied by Zimmermann concerned a woman twenty-four years old, with no hereditary or personal tubercular history. The disease had attacked the left eye only, and commenced with a zone of episcleral injection near the border of the cornea, and a violet coloring which was accompanied almost simultaneously with a punctiform parenchymatous infiltration of the periphery of the cornea at the corresponding point.

There were no subjective disturbances, with the exception of a slight degree of photophobia. The right eye showed no lesion. This condition persisted with alternating improvement and aggravation

for two or three months. After that was found an infiltration of the cornea, triangular in form, with fine vessels in the deep layers of this membrane. The base of the infiltrated zone touched the periphery of the cornea. The iris showed signs of irritation, and at this time small punctiform opacities could be seen to develop in the vitreous humor. A sub-conjunctival injection of trichloride of iodine produced no improvement. Six months after the commencement, the corneal infiltration had increased somewhat in extent, and a similar zone of infiltration had appeared at the opposite border. A short time after, the symptoms of irritation increased, the aqueous humor became cloudy, iritis was more manifest, and posterior synechia and disturbances of the vitreous developed.

Examination of the cornea with a lens showed that the opacity was composed of a series of little opaque points. Specific treatment was of no avail. A year after the commencement the cloudiness of the anterior chamber had increased to such an extent that it was no longer possible to distinguish the fundus of the eye. There was found to be a considerable diminution of vision in this eye. The conjunctiva was thickened and traversed by large vessels at the corresponding points.

The cornea was completely clouded over. The anterior chamber, in its lower portion, was filled with an organized exudate of grayish yellow color. The pupillary field was obstructed. In the upper portion of the eyeball, near the limbus, was a scleral ectasia. The tension of the eye was slightly increased. Sensitiveness to pressure was more marked than in the normal state.

Enucleation was performed one year after the commencement of the disease.

Macroscopic examination revealed a thickening of the cornea, the sclera, the conjunctiva, and the iris. The ciliary body did not seem to be diseased. The lower portion of the iris was indistinguishable from the cornea by reason of the existence of an organized exudate. The lens was normal, with the exception of an anterior capsular cataract. The retina and the choroid did not seem to be changed.

Histological examination of the eyeball showed nodular lesions, typical tubercular granulations with giant cells. In the cornea the tubercular lesions (granulations and infiltrations) were more especially localized in the deep layers of the membrane. The conjunctiva, sclera, and iris were altered by the same lesions. The ciliary body was healthy, with the exception of a small circumscribed infiltration. There was vascularization of the cornea in the mucous layers.

The other parts of the eye showed no lesions.

The optic disc was slightly œdematous. There was some cellular infiltration.

Microscopic examination revealed the presence of tubercle bacilli in the giant cells and in the infiltrated tissues.

This was, in sum, a case of tuberculosis of the cornea, the sclera, the iris, and the conjunctiva, of quite peculiar development. The diagnosis was not made clinically, as the patient had no hereditary or personal history.

XII.—The Venous Canal of Schlemm Is Not in Direct Communication with the Anterior Chamber, by Drs. TH. LEBER AND BENTZEN.

A refutation of the conclusions of Gutman's article reviewed above. Gutman experimented upon the eyes of cadavers. Leber has repeated these experiments on eyes as fresh as possible (two hours after death), as well as on the eyes of animals. The following are his conclusions: There is no direct communication between the anterior chamber and the canal of Schlemm. On the other hand, in freshly enucleated eyes, fluids injected into the anterior chamber filter easily through the intercellular spaces of the endothelial surfaces into the venous circle and thence into the efferent branches of the anterior ciliary veins. Soluble colors which are not precipitated in the anterior chamber pass without difficulty; the same is true of India ink. On the other hand, Prussian blue only passes under certain conditions because it is precipitated on contact with the aqueous humor and the grains are in general not fine enough for filtration. Injection of Prussian blue and India ink into the venous circle by the anterior chamber succeeds the better if performed some time after death, a fact which is probably due to desquamation of the endothelial surfaces.

It is difficult to make these experiments on the eye of a living animal, for the transportation of coloring matter by the leucocytes must be taken into consideration. In certain cases Heistrath has been able to obtain passage of Prussian blue or carmine into the efferent veins. These experiments once more show that during life also re-establishment of normal pressure results from filtration into the veins. It also follows that in the normal condition a filtration should occur which corresponds to the difference of pressure between the anterior chamber and the efferent veins. But at present we have no data concerning these differences. It also results from this that the maintenance of the ocular pressure depends upon the equilibrium between secretion and filtration of the aqueous humor.

Archives d'Ophthalmologie

Reviewed by Dr. DE BOURGON.

October, 1894.

I.—Investigations of Osseous Tumors of the Orbital Region, by Dr. MITVALSKY.

This article is divided into two parts :

1. *Two cases of osteomas of the frontal sinus, with histological researches on the pathological products of the mucous membrane of the frontal sinus.*

2. *A case of multiple hyperostosis of the bones of the orbit complicated with formation of cartilage in the external rectus muscle and in the periosteum.*

Important conclusions may be drawn from the two cases of osteoma of the frontal sinus :

1st. The osseous tumor, due to the action of a considerable traumatism, was positively forced to grow in the cavity of the frontal sinus, and originated in the compact internal osseous layer of the wall conjointly with the periosteum.

2d. The radical operation for orbital osteomas is far from being as discouraging as is generally stated by authors (Berlin, de Wecker, Bornhaupt, etc.).

Indeed, in the first case in which there was a radical cure for osteoma the success was absolutely complete, and Professor Weiss had refused to operate upon the patient. As long as the brain and its soft envelopes show no serious pathological changes the operation should be undertaken. It is not contra-indicated even when the osteoma is substituted for a part of the bony wall of the cranium, and when the dura mater is united to the surface of the osteoma.

In the second case, the osteoma, the osseous base of which narrowing the orbit was resected, was arrested from further development by this operative interference, and the success obtained continued for three years.

The case of hyperostosis is exceptional, since up to the present time it is the only case in which orbital hyperostosis complicated with the formation of cartilaginous tissue in the periosteum and in one of the recti muscles has been definitely found.

II.—On Corneal Suture after Cataract Extraction, by Dr. KALT.

(See these *Annales*, Vol. CXII., p. 271, 1894.)

*November.***I.—Tetanus Following Traumatism of the Eye and Its Adnexa ; Ocular Symptoms of Tetanus, by Dr. FROMAGET.**

(See these *Annales*, Vol. CXIII., page 48.)

II.—Colloid Degeneration of the Endothelium of the Posterior Chamber of the Eye, by Dr. E. BERGER.**III.—The Position of Repose of the Eyes, by Dr. J. REBOUD.**

The author employed Dr. Snellen's apparatus.

The result of the numerous measurements taken was that in emmetropia the position of repose is most frequently parallelism and divergence; the length of the base line seems to have no influence on the results. In myopia, the position of repose is convergence, and the length of the base line seems to be of no importance; the same is true of hypermetropia.

It should be stated that this form of experiment gives rather the physiological habit of each eye than the true position of repose.

*December.***I.—Dr. von Helmholtz : Biographical Sketch, by Dr. LANDOLT.****II.—Two Cases of Hyaline Degeneration of the Conjunctiva, by Dr. VAN DUYSSE.**

The disease is very rare, and does not recur after total ablation of the tumor.

According to the works of Raehlman, principally, amyloid degeneration of the conjunctiva has four phases : 1st, adenoid proliferation; 2d, hyaline degeneration; 3d, amyloid degeneration; 4th, calcification and ossification.

In Dr. Van Duyse's first case the conjunctival lesion had lasted for more than eight years, and the principal reactions for amyloid material (iodine in iodide of potassium, methyl violet, methyl green, and safranine) did not reveal the presence of this substance in the interstitial vitreous portions. The passage of the second form into the third does not seem, then, to be absolutely demonstrated; this is, in fact, the opinion of Kamocki and of Vossius.

It will, indeed, frequently happen that such a tumor, *amyloid*, according to the clinical diagnosis, will only reveal an adenoid proliferation with hyaline degeneration. The name, then, should be modified, and a clinical case corresponding to the diagnosis of amyloid degeneration of the conjunctiva should be called *hyaline-amy-*

loid degeneration of the conjunctiva. A very complete histological examination of two tumors which he had removed was made by the author.

III.—On Epithelioma of the Bulbar Conjunctiva and Its Propagation in the Eyeball, by Drs. LAGRANGE and C. MAZET.

The result of this essay was that in an eye removed from a woman sixty-five years old—

1. There was an epibulbar epithelial tumor, which had penetrated into the eye exactly in the region of the limbus.

2. The point of penetration was circumscribed, and the tumor advanced in the form of a narrow bud, which, after penetrating the eye, formed the pedicle of the internal portion of the neoplasm.

3. The neoplasm had developed from without inward, examination of histological preparations showing, without any doubt, all the signs of invasion of the eye by the epibulbar tumor.

Large elements were to be noticed in the tumor formed of hyaline protoplasm, in the centre of which was a homogeneous mass colored pale red with picro-carmin and having a nucleolus very brilliantly colored. Furthermore, there were perfectly round mucous cavities with a double refracting contour; beside these forms were also seen epithelial elements in state of multiplication, large cells with multiple nuclei, intercellular formations already described by Dr. Lagrange, and finally a large cell having in its interior three elements of ovoid form, which raised a suspicion of being small parasitic organisms.

The external tumor had infiltrated along the sclero-corneal junction, and the lesion had proliferated into the artificial cavity, which it had formed by separating the choroid from the sclera.

January, 1895.

I.—The Theory of Color, by Dr. NICATI.

In this important essay, the author, after defining color as the *harmonic appearance of light*, taking the word harmony in its most general sense, considers: 1st, the physiological science of color (chromology); 2d, an exposition of the scales (chromotaxy); 3d, the developmental forms of the sense of color (chromorphism); 4th, the mechanism of the luminous sensation of the scales and of the chroic forms (chromogenesis).

The first and second parts, all composed of facts and mostly mathematical theorisms, is hardly capable of analysis. It only serves as substratum for the other two parts, far more interesting from a practical standpoint.

The sense of color did not, in fact, reach its present degree of perfection at once; it has in the animal series and in man gradations which may be grouped under three chief heads: 1st, protochroism; 2d, metachroism; 3d, pleochroism.

There are also two regressive forms; 1st, chroic amblyopia; 2d, hemeralopia or athermidia.

The general mechanism of the luminous sensation has three stages corresponding to the three cellular layers of the retina (the rods and cones of the external cellular layer, the bi and uni polar cells of the middle cellular layer, and the multipolar cells of the internal cellular layer) which may be physiologically designated as: (a) *Electroblasts* (external layer); (b) *Optoblasts* (middle layer); (c) *Synoptoblasts* (internal layer); corresponding to the three stages: 1st, electrogenetic stage; 2d, optogenetic stage; synoptogenetic stage of luminous sensation.

II.—The Role of Astigmatism in the Genesis of Cataract, by Dr. ROURE.

This essay is based upon 33 cases of double cataract, and the following conclusions are reached:

1st. In 80% of the cases, when the two eyes are unequally astigmatic, the first eye to be attacked with cataract is the most astigmatic eye.

2d. The degree of astigmatism has an influence on the date of appearance of the cataract.

3d. The proportion of non-astigmats among the cataract cases was 16.6%.

4th. Astigmatism is not a cause of cataract, since the proportion of non-astigmats among non-cataractous individuals is 9.2%.

5th. Astigmatism should not be regarded as a cause, but as a condition favoring the morbid process, when, for unknown reasons, the lens begins to become opaque.

February.

I.—Calcified Epithelioma of the Lids, by Drs. BRAQUEHAYE and SOURDILLE.

The case was that of a calcified tumor of the lids removed from a man forty years of age.

Histological examination, after prolonged decalcification in very dilute hydrochloric acid, and coloring with Ranvier's picro-carmin

or Boehmer's hematoxyline, showed the presence of a thick surrounding membrane limiting the contents of the tumor in a very precise manner. Tracts parted from the internal surface of this membrane which anastomosed with each other and partitioned the tumor into spaces of irregular form and variable size, but which, as a rule, increased from the peripheral surface to the centre.

The meshes of this network were filled with a tissue which was colored clear yellow in the sections stained with picro-carmin and clear violet in those stained with hematoxyline. This netting showed in certain parts islands of irregular form composed of connective tissue stained rose-color. Here and there in the sections appeared the lumens of several large capillaries.

On higher magnification (Leitz. obj. 7. oc. 1.), the following histological composition was observed :

The surrounding membrane was composed of bundles of fibrous tissue, and the tracts parting from them were formed of connective tissue. Between the lobules the fibrillary tissue was filled in with an innumerable quantity of cells, polyhedral, fusiform, etc. In parts, these cells formed nests which were the starting point of epitheliomatous nodules. Here and there were several rare myeloplques. The lobular islands were formed of epithelial cells of the stratified pavement type. Their dimensions varied from 12 to 18 μ . In the centre were seen numerous foliaceous refracting cells, concentrically disposed, and resembling epidermic globes. In a few spots could be seen a fatty granular detritus situated in the centre of the epidermic islands.

The study of this tumor gave rise to a general review, historic, pathogenetic, etc., of this rare affection.

II.—The Field of Observation in Ophthalmoscopic Examination with the Inverted Image, by Dr. GUILLOZ (to follow).

March.

I.—Empyema of the Maxillary Sinus Complicated with Orbital Osteo-periostitis, with Perforation of the Vault, Abscess of the Frontal Lobe, and Atrophy of the Optic Nerve; Death, by Dr. PANAS.

(See these *Annales*, Vol. CXIII., p. 279.)

II.—An Attempt to Apply Sero-therapeutics to Conjunctival Diphtheria, by Dr. GAYET.

In a child sixteen months old, $\frac{1}{1200}$ of its weight of Roux' fluid was injected. The temperature mounted to 38.7°, and the following day everything had resumed its normal state, from the point of view

of the general condition. Seven days after the injection the false membranes ceased to reappear, and disappeared ten days later. Application of warm compresses caused the corneal disturbance to disappear after forty days. During the laboratory investigations the false membranes had been cauterized with nitrate of silver, and three or four instillations of lemon juice were given.

If this case is compared with those described by Coppez and by Jessop, there is no doubt that if, with Belgian and English patients, *an injection of prepared serum causes the diphtheritic membranes to melt, as the sun melts ice*, in Dr. Gayet's case *there is a decided impression of doubt as to its efficacy*.

Possibly this difference in the results is due to the use of different fluids. Thus Coppez used Behring's serum; Jessop, Klein's antitoxine, and Dr. Gayet, Roux' serum prepared by Arloing.

III.—Clinical Observations on the Surgical Treatment of Strabismus, by Dr. LANDOLT.

I.—*Diverging Strabismus*.—A girl twenty-two and a half years old. OS. Convex cylinder + 0.50 with vertical axis. V = 0.9 to 1. OD. Concave cylinder with horizontal axis. V = 0.9 to 1. The right eye was diverging. The deviation of the eye dated from birth. Its extent was 27°. No angle χ . No binocular vision. Excursions of the two eyes were notably limited on the nasal side, where they scarcely exceeded 40°. On the temporal side they reached 50 to 60°. Both internal recti were advanced, and the left external rectus tenotomized. Binocular vision was established, and for three years the patient used her eyes freely and without fatigue, even though she was a teacher. At the commencement of the year she returned with asthenopic symptoms, due to the fact that divergence exceeded the normal, while convergence fell below it.

Before proceeding to surgical interference, recourse should be had to *pacific treatment* (absolute rest of the eyes, tonic regimen, exercise in the open air, sufficient sleep, and proper glasses).

II.—*Insufficient Divergence*.—An advocate, about thirty-two years old. He was treated by optical methods, and the internal recti muscles were tenotomized three different times, on account of asthenopic symptoms (headache, vertigo, and apparent doubling of fixed objects). Vision was normal. An extensive advancement of the external rectus of the right eye, followed by orthoptic exercises, was sufficient to establish harmony between symmetrical movements, and gave the patient free use of his eyes. On returning home, he resumed

his occupations, and is now able, without fatigue, to do any work whatever.

IV.—Enophthalmus with Intermittent Exophthalmus at Will, by Dr. VAN DUYSSE.

The patient was a collier, twenty-nine years old, who had received an injury and suffered from tuberculosis in the first stage. Whenever he leaned over or made an effort, the eye protruded from the head. At such times vision was abolished. With slight pressure the eye was easily pushed back in the fundus of the orbit. This affection was due to post-traumatic tropho-neurotic disturbances, causing gradual absorption of the fatty cushion of the orbit. The progressive disappearance of this tissue was the cause of varicose dilatation of the retro-ocular veins. The intermittent exophthalmus "at will" was due to the fact that the intra-vascular tension increases in the veins of the head (continued effort or compression of the jugulars), a phenomenon caused by the enormous dilatation of which these veins are susceptible. At the moment of ocular projection there was pupillary dilatation due to sympathetic stimulation by a reflex channel, irritation caused in the ciliary nerves from the dragging upon them by projection of the eye.

V.—A Case of Primary Tuberculosis of the Ciliary Body and of the Iris, by Dr. LAGRANGE.

Histological examination was confirmed by bacteriological examination, but it should be stated that it was only in the thirty-seventh preparation that the presence of tubercle bacilli was demonstrated, and then only a *single microbe* was found.

VI.—Comparative Embryology and Anatomy of the Angle of the Anterior Chamber in the Chicken and in Man, by Dr. J. GABRIÉLIDÉS.

The ligamentum pectinatum persists in the chicken, but disappears in man about the end of embryonic life. The posterior wall of the canal of Schlemm is continuous with the corneal endothelium in man and in the chicken. The ciliary muscle of the chicken is formed of two parts, an anterior and a posterior; in man there is, as a rule, only one part corresponding to the posterior portion of that of the chicken. The layer of Henle of the iris does not exist in the chicken in the sense that it is represented by the fine radiating and striated fibres of the dilatory muscle. The ciliary muscle in man is

fixed to the summit of the angle of the anterior chamber, while in the chicken it is inserted in the canal of Schlemm.

April.

I.—On Disturbances of the Ocular Apparatus Produced by Lightning Strokes, by Dr. ROHMER.

The case was that of a lad twelve and a half years old who, in August, 1892, was struck by lightning and lay on the ground for some time unconscious. About two years later he came to the hospital with increasing diminution of vision dating from September, 1893.

At the time of his entrance in the hospital he counted fingers with the right eye at about 11 centimetres, and with the left eye could not count them at any distance. Ophthalmoscopic examination showed that there was white atrophy of both discs. In spite of injections of antipyrine and alternate instillations of eserine and atropine, vision improved but little, and the final result was:

OD, V — $\frac{1}{15}$. OS, V — $\frac{1}{15}$ with difficulty. In connection with this case, the author made bibliographic investigations on this subject, and published a general review of the disturbances produced by lightning strokes.

II.—Attempted Rape; Blows and Severe Injuries; Arterio-Venous Aneurism of the Right Orbit; Left Optic Atrophy Followed by Incapacity for Permanent Work, by Drs. GUIBERT and BLÉ.

III.—Two Cases of Double Congenital Ophthalmoplegia Externa, by Dr. MAGINELLE.

This affection did not in either case attack the internal muscles of the eyes (sphincter of the iris and muscle of accommodation). There was moderate ptosis and convergent strabismus, double in one case and unilateral in the other. The two patients were brothers.

This was a nuclear ophthalmoplegia, a systematic lesion analogous to the superior polyencephalitis of Wernicke.

From the pathogenetic standpoint, there was an hereditary nervous stigma, attributable to alcoholism, which had attacked three children in the same manner and respected the others, two in number.

IV.—Field of Observation in Ophthalmoscopic Examination with the Inverted Image, by Dr. GUILLOZ.

When the examining lens is brought nearer the observed eye, the examiner, in a stated position, only perceives a very small field.

The portion of the retina observed increases with the *power* of the lens, and with its *diameter*.

The diameter of the lens may be made (Helmholtz's indications) equal to half the focal distance.

The condition of disappearance of the iris of the observed eye is :

$$D - f > \frac{l}{\omega}$$

D = Distance of the observed eye.

f = Focal distance of the lens.

l = Diameter of the lens.

ω = Pupillary opening of the observed eye.

The observation should be made during the disappearance of the image of the iris.

The disappearance of the image of the iris is determined by the equation :

$$h^2 - h \left(D - \frac{\omega}{l} f \right) + Df - Df \frac{\omega}{l} = 0$$

h = Distance of the iris from the examining lens.

h^2 = Distance of the visual image of the iris from the examining lens.

The formula giving the reappearance of the image of the iris is :

$$h^2 - h \left(D + f \frac{\omega}{l} \right) + Df + Df \frac{\omega}{l} = \omega$$

The field of an observer with punctiform pupillary opening is given before the disappearance of the image of the iris by :

$$x = \gamma \frac{\omega (D - f - h)}{h^2 + D (f - h)}$$

γ = Distance of the retina from the nodal point.

This formula reduces to :

$$x = \gamma \omega \frac{D - 2f}{+ 2}$$

when the focal plane of the lens is in the pupillary plane of the subject.

When the field of the observer with punctiform pupil is not limited by the image of the iris this is given by :

$$x = \gamma \times \frac{l}{f} \times \frac{D - f - h}{D - h}$$

which reduces to :

$$x = \gamma \times \frac{l}{f} \left(1 - \frac{f}{D - f} \right)$$

since $h = f$.

After the reappearance of the image of the iris, the field is given, the observer having a punctiform opening, by the equation :

$$x = \gamma \times \frac{\omega (D - f - h)}{-h^2 + Dh - fD}$$

Given the observed eye *emmetropic*. The lens is at a distance h from the pupillary plane of the observed eye. The observer has a pupillary opening of size ω , and is at a distance Δ from the examined eye.

Of these cases, the most interesting from a practical point of view is that in which the image of the iris has disappeared from the field. We then have :

$$\delta = \frac{l}{f} \left(1 - \frac{f}{\Delta - h} \times \frac{l - \omega}{l} \right)$$

When the observed eye is *hypermetropic* and the image of the iris has disappeared, and when the observer has a punctiform opening, we have :

$$\delta h = \delta + \frac{D(h - f) - h^2}{D - h} \times \frac{l}{fR}$$

If the field of observation of a *myopic* eye is studied in the simple case when the observer has a punctiform pupillary opening, and when the image of the iris has disappeared from the field, we obtain :

$$\delta m = \delta + \frac{h^2 - hD + fD}{D - h} \times \frac{l}{fR}$$

From these equations it results that :

1st. In *emmetropia* the field of observation is expressed by :

$$x = \gamma \frac{l}{f} \left(1 - \frac{f}{\Delta - h} \times \frac{l - \omega}{l} \right)$$

2d. In *hypermetropia* the field is given by the formula :

$$xh = \gamma h + \delta h = \gamma h \left(\frac{x}{\gamma} + \frac{D(h - f) - h^2}{D - h} \times \frac{l}{fR} \right)$$

3d. In *myopia*, the field is represented by

$$xm = \gamma m \delta m = \gamma m \left(\frac{x}{\gamma} + \frac{h^2 - hD + fD}{D - h} \times \frac{l}{fR} \right)$$

In *curvature ametropia*, immediately after the disappearance of the image of the iris, the field of observation of *hypermetropia* is smaller than that of *emmetropia*, which in turn is smaller than that of *myopia*. The differences increase proportionally, according to the degree of *ametropia*.

In *axillary ametropia* the field of *myopia* is generally greater than that of *emmetropia*, which in turn is greater than *hypermetropia*.

The propositions leading to these definite results were verified by experiments which were in perfect accord with the algebraic equations.

May.

I.—The Correcting Glass for Presbyopia, by Dr. LANDOLT.

For its determination, it should be remembered that :

1st. Like all muscular work, that which is performed by the muscle of accommodation requires a certain *reserve fund*.

2d. This reserve of power is not represented by an absolute value, but by a constant fraction, a proportion of the disposable accommodative power.

3d. The reserve fund of accommodation is about one-third of the total amplitude of this function.

From these rules it results that to determine the correcting glass in presbyopia the amplitude of accommodation must first be established, and then two-thirds of this taken, and this figure, combined with that of the static refraction, gives the available p (1). The working glass is that which has this p in the number of dioptries corresponding to the distance of the work.

II.—Six Cases of Osteoma of the Frontal Sinus, by Dr. COPPEZ, JR.

Case I.—A man twenty years old, without personal or hereditary history, with severe pain, sinusitis, and no ophthalmoscopic signs. *Healthy side*, $V = 1$. *Diseased side*, $V = \frac{1}{3}$. A partial resection was performed, with the result of a persistent fistula lasting for ten years.

Case II.—A woman sixty-five years old, no history; no pain or ophthalmoscopic symptoms; sinusitis. *Healthy side*, $V = 1$. *Diseased side*, $V = \frac{1}{3}$. Total ablation; recovery.

Case III.—A man twenty-five years old, no history, no pain, and no sinusitis, showing on ophthalmoscopic examination papillitis with stasis. *Healthy side*, $V = 1$. *Diseased side*, $V = \frac{1}{3}$. Total ablation; recovery.

Case IV.—A man twenty-two years old, who had received an injury two years previously. No pain, sinusitis, and no ophthalmoscopic signs. *Healthy side*, $V = \frac{2}{3}$. *Diseased side*, $V = \frac{1}{3}$. Total ablation; recovery.

Case V.—A woman twenty years old. No history. Severe pain, with sinusitis. A slight stasis of the disc. *Healthy side*, $V = 1$. *Diseased side*, $V = \frac{1}{3}$. Total ablation; recovery.

(1) By p the author designates the maximum of refraction realized by the eye by joining to its static refraction the total dynamic refraction.

Case VI.—A man forty-eight years old. No history. Pains at the beginning, which disappeared. Sinusitis. *Healthy side*, V=1. *Diseased side*, V=0. The disc was atrophied as a result of stasis. The patient refused an operation.

III.—Study of the Ocular Surgery of Pellier de Quengsy,
by Dr. ALBERT TERTON.

(See these *Annales*, July, 1895, p. 79.)

IV.—An Optometric Scale, by Dr. PARENT.

June.

I.—Anatomical Description of an Eye with Corneal Ulcer and Hypopyon, by Dr. NUEL.

The results of this anatomo-pathological study, made on a man fifty-five years old, were as follows: 1st, the pus of the hypopyon did not come from the corneal ulcer (there were no migratory cells infiltrated in the deep corneal layers); 2d, near the ulcer, the thickness of the cornea was increased because of an interstitial œdema which distended the inter-fibrillary openings; 3d, there was no corneal epithelium over the ulcer; 4th, the hypopyon, in places, reached the lower border of the pupil. Behind the cornea it extended in a fine tract to the ulcer. It was composed of cells and a mass of fibrin; 5th, the endothelium of the anterior chamber was not noticeable on the surface of the iris—it seemed to be lacking there; 6th, the iris was inflamed, swollen, and infiltrated with yellow cells; 7th, in the angle between the iris and the ciliary body was a collection of pus; 8th, all the lower portion of the eye along the ciliary body presented a purulent tract; 9th, there was a small abscess in the vitreous humor; 10th, throughout the entire extent of the lens the hyaloid membrane was slightly raised and detached in places from the capsule. A few isolated pus cells were here encountered. But, as in other parts of the eye, these openings were infiltrated with numerous pigmented globules.

II.—Hysterogenetic Zones of the Organ of Vision,
by Dr. BERGER.

The author concludes, from the observation of an hysterical patient twenty-seven years old, that the retina may be a hysterogenetic zone.

III.—On the Ophthalmoscopic Diagnosis of Astigmatism,
by Dr. GUILLOZ.

The author has succeeded in demonstrating, *geometrically*, and in an *elementary* manner, the different appearances presented by the disc of an astigmatic eye observed with the erect or inverted image.

IV.—BOOK NOTICES

MEDICAL JOURNALS

Further Notes on the Treatment of a Case of Exophthalmic Goitre, by Mr. DAVID OWEN. (*Brit. Med. Jour.*, No. 1781, p. 361.)

In 1873 the author communicated his observation of a typical case of exophthalmic goitre, which, after having lasted for twenty years, was quickly healed by ingestion of the thyroid gland of a calf. In the observation it had been reported that the patient had taken, by mistake, a quarter of a pound of thyroid gland twice a week. This assertion had led Mr. Hector Mackenzie to remark that the thyroid gland weighed only eighty grains (6.68 grammes), and that twenty entire glands would have been necessary to make a quarter of a pound. On investigating this point I discovered that the patient had not taken the thyroid gland at all, but the thymus (sweet-bread). This point was made certain by a microscopic examination.

In England the butchers are well acquainted with the thymus of the calf (sweet-bread), but they are completely ignorant of the existence of the thyroid gland. (It is not so in Switzerland and in Savoy.)

It is pertinent, then, to inquire whether the cure observed is due to chance, or whether it should be attributed to the ingestion of the sweet-bread. This latter supposition is very probable, for the cessation of the remedy was followed by a return of the malady. The absorption of the thymus was discontinued in January, 1894. At first, no change was observed, but some time after the patient was sensible of fatigue and complained of palpitations on the least effort. His thyroid gland, which had become invisible and inpalpable during treatment, could be easily seen and recognized by touch on the 20th of March. At the moment of the patient's arrival his pulse was 110, but it fell to 84 after resting ten minutes.

Treatment with the thymus was then resumed, with complete success. On July 23 the patient could work twelve hours a day without feeling excessively fatigued. He had gained in weight. Before resuming the treatment, he had had palpitations every day, while now he was perfectly free in this respect. Pulse was 72, while it had been 120 before the first treatment. The ocular symptoms had disappeared, as well as the swelling of the thyroid. The patient

has taken one lobe of the cervical portion of the calf's thymus three or four times a week. Each interruption of this treatment has brought a return of the symptoms after a brief period. For two months he has taken one lobe a week.

The author cites several facts which seem to indicate that the physiological action of the thymus and the thyroid is antagonistic. In thyroidism, and in exophthalmic goitre, where there is probably hypersecretion of the thyroid, it ordinarily comes from emaciation, while the persistence of the thymus seems to produce the contrary effect. With animals that hibernate, the thymus persists during life and grows during the period of hibernation. —S.

Fatal Hemorrhage from the Palpebral Conjunctiva,
by Dr. STORWER. (*Deutsche med. Wochens.*, 1895, p. 90.)

On August 26, 1894, a child seven months old was brought to the writer with a small red tumor on the left upper lid, which had appeared a few days before, and had given rise to hemorrhages causing great anxiety, ceasing only during sleep. These hemorrhages had in the short time greatly weakened the child, who was formerly quite strong. A compress bandage had produced no effect.

The child was sleeping on its arrival, and was very pale. A clot glued the two lids together. Its removal was followed by an arterial hemorrhage, escaping drop by drop from the palpebral fissure. The source of this hemorrhage was found to be a fleshy protuberance about the size of a small pea, situated in the neighborhood of the upper cul-de-sac. Its excision and the insertion of three sutures put a stop to the hemorrhage, but death followed in two days. The prompt cessation of the hemorrhage after excision of the tumor excluded the idea of hemophilia. There was no sign indicating the existence of a disease predisposing to hemorrhages. On microscopical examination the tumor was found to be denuded of epithelium. An early excision would probably have saved the child's life.—S.

Filaria in the Human Eye, by Dr. GAUTHIER. (*Annales de l'Institut chirurgical de Bruxelles*, 1895.)

On July 7, 1894, a priest brought a young negro, five or six years old, to Dr. Tacke's clinic. The child did not complain, but something moving was noticed in the left eye.

On the first examination, nothing abnormal was seen except a reflex which passed rapidly over the pupillary field.

With lateral illumination, a fine filament was distinctly seen,

which revolved with great rapidity in the fluid of the anterior chamber. This filament measured about 2 centimetres in length and 1 millimetre in thickness. It was too long to remain straight in the anterior chamber, and was ordinarily folded in half, undulating rapidly throughout its entire length.

The author gives a rapid review of scientific literature on the subject of the entozoa which may be encountered in the eye.

"I think," he says, "that these filaria are introduced in an embryonic condition, and, passing into the circulation, develop in the tissues and the organs in which venous stasis is the most considerable."—DASTOT.

Treatment of Ulcerative Blepharitis with Tincture of Iodine, by Dr. LOPEZ. (*Archivos de la Policlinica*, No. 1, 1895. Havane.)

A radical cure for ulcerative blepharitis following the formation of small abscesses on the free border of the lid is obtained in ten or twelve days with palpebral applications of pure tincture of iodine every day or every other day.

In one patient a second attack occurred at the end of a year, but it was rapidly cured.

Contact of the caustic with the cornea or the conjunctiva should, of course, be avoided.—DE B.

Automatic Accommodation Glasses, by Dr. GRADENIGO. (*Atti der R. Istituto Veneto di Scienze, Lettere ed arti*, Vol. VI., Series VII., 1894-1895.)

By a very ingenious device of the writer, the wearer of these spectacles, who has two pairs of glasses mounted separately and superimposed, can with great ease raise on the forehead, or bring before the eyes at his pleasure, the exterior and movable pair of glasses, and this facilitates near and far work. This is a new system, with the same object as the Franklin spectacles. There are, however, very few people who would care to be supplied with this optic artillery.—BITZOS.

A Case of Dermatoxia Noxialis, by Dr. GRADENIGO. (*Atti der R. Istituto Veneto di Scienze, etc.*, 1894-1895.)

This was the case of a child recently arrived from Brazil. He had a swelling on the left upper lid which had developed little by little for a month. It was bright red in color: the lid fell before the eye, and the latter showed nothing abnormal except a slight serous chemosis. On the inner side of the tumor were two small openings, through which from time to time a clear fluid escaped in little drops,

and then very small horns protruded, which retracted as soon as they were touched. They were like the horns of a snail. On opening the pouch two larvæ of *dermatobia noxialis* were revealed, ovoid in form, and measuring 14 to 15 millimetres in length.

A Singular Perversion of Color Perception,

by Dr. HOMER E. SMITH.

A boy aged eleven, three months after an attack of scarlatina unattended with renal complications, developed the following symptoms: Staggering and shooting forward in walking, slight weakness, formication and tingling of the right side, diminished contact and pain sensation on both sides, but greater on the right, pain in occipito-frontal, cervical and temporo-maxillary regions, and emotional disturbance, as shown by causeless weeping.

Three days later the child said that white surfaces appeared brown. It was found that he could select colors correctly as to shade, but that each was seen as its complementary—i. e., red was called green, green red, blue appeared as yellow, yellow as blue, and white as brown. There was micropsia, metamorphosia, and monocular polyopia of each eye. Vision, O. D. $\frac{4}{20}$, O. S. $\frac{6}{20}$. Fields, marked peripheral limitation, greater in right. No scotomata. Accommodation not impaired. Pupils equal and of normal size, contract to light consensually, to convergence and peripheral excitation of retina. The ophthalmoscope disclosed diffuse retinitis both eyes, greater in right.

For three or four days the symptoms increased in severity, and to them were added slight anæsthesia of smell and taste. Then improvement began and rapidly progressed, until, at the end of four weeks, nothing remained of the disease except slight nervousness, and a tendency to emotional disturbance.

The author regards the condition of the pupils as of diagnostic value. Responding as they did when light was thrown on the periphery of the retina, where the field was wanting, it showed that the lesion was either back of the communicating fibres of the optic tract to the motor-oculi nucleus, or higher up in the optic thalamus or internal capsule.

He diagnoses the case as a localized effusion, perhaps hemorrhagic, in the left optic thalamus, with pressure effects involving the internal capsule in its thalamo-lenticular division, and asks, in conclusion, if it may not be possible that the optic centre of the thalamus has for its function the ordering and arranging of the impres-

sions of light, form, and color received in the cortex, and that the disturbance of this centre led to the perversion of the color perception in this case.

BOYER.

A Contribution to the Study of Endotheliomas of the Orbit (Angiosarcomas of Kolazcek), by Dr. VAN DUYSE. (*Le Scalpel*, March, 1895.)

This memoir, entitled "Angiosarcome tubuleux de l'antre d'Highmore," comprises twenty-one pages, with four illustrations, of the January number of the *Annales of the Medical Society of Ghent*. It is reviewed as follows by Dr. Nuel:

"The surgeon who introduces his history into the orbit for a case of retrobulbar tumor rarely knows what he will encounter. This clinical uncertainty arises, in part, from the fact that in the past the microscopic nature of this kind of tumor was not known. Kolazcek was the first to show that certain tumors, described sometimes as sarcomas, sometimes as carcinomas, and again as epitheliomas, originate in a proliferation of endotheliomas.

"Dr. Van Duyse shows in particular cases how, from relative development of endothelial tubes on the one hand, and of the connective tissue stroma on the other hand, these tumors originate which have been considered quite different, as is shown by the names, colloid epithelioma, myxosarcoma, carcinomatous sarcoma, angiosarcoma, endothelial carcinoma, endothelioma, psammoma, etc., etc.

"Light is thrown upon the various parts of this obscure chapter of pathological anatomy by the author. His article is an important contribution to the study of these tumors. From the ophthalmological standpoint, it appears as an initiative work."—DASTOT.

Filamentous Keratitis, by Dr. MACKLEISH. (*Med. Rec.*, March 16, 1895.)

M. W. C. — came to consult Dr. Mackleish with an affection of the right eye of thirty-eight hours' duration. A superficial keratitis was found composed of filaments accompanied with corneal ulcerations. Under treatment, the ulcers rapidly cicatrized, but the filaments remained until they were removed surgically. Recovery was then perfect. The first case of this rare disease, since it was only encountered by Nuel and Uhthoff once in 6,000 patients, and by the author once in 7,000, was due to Leber (1882). It is to Hess and Nuel that we owe our knowledge of the microscopical structure of the filamentous cornea produced by a peculiar disease of the epithelium.

This affection may be primary or secondary. In the latter case, according to Albrand, the lesions follow the use of impure atropine.

Sometimes a solitary filament will be produced after puncture of the cornea, necessitated by discission for secondary cataract, but in this case it is only a false filament (Hess).—DE B.

On Confusion of Colors, by Dr. BEETZ. (*Münchener medicin. Wochenschrift*, March 5, 1895.)

The colors used for railroad signals are green, red, and blue. Blue has been recently employed in Germany as a signal for stopping, but it has happened that employees with normal perception of colors have mistaken the blue for the red in foggy weather. Mist, in fact, absorbs the rays from the cold portion of the spectrum, while it allows the red rays to pass. Hence the sun seen through a mist appears red.

Spectroscopic examination has shown that the blue glass employed by the German railroads allows red rays to pass through it. Under these conditions, confusion of blue and red by people with normal color perception is possible. Spectroscopic examination of the various commercial blue glasses shows, however, that it is possible to manufacture blue glass which does not transmit red rays. The color of signals obtained with this glass cannot appear red in foggy weather.—SULZER.

A Case of Acromegalia with Hemianopic Pupillary Reaction, by Mr. LYNN THOMAS. (*Brit. Med. Journal*, June 1, 1895.)

A girl eighteen years old has suffered from typical acromegalia for six years. The visual organ presents the following peculiarities:

In January, 1895, slight alternating convergent strabismus with preservation of movements was observed. The right eye was completely blind, and the pupil did not react to light. In the left eye there was temporal hemianopsia and optic atrophy less pronounced than that of the right eye. When the image of a luminous point was made to fall on the blind temporal portion of the left retina the pupil did not react. If, on the other hand, the seeing portion was illuminated, both pupils contracted. The affection was probably localized in the optic bands in front of the anterior corpora quadrigemina, for the commissural fibres of the centres of consensual pupillary reaction are probably situated in the anterior corpora quadrigemina.

On April 29, 1895, another examination showed the existence of bitemporal hemianopsia. There was, then, a lesion of the chiasm.—S.

Two Cases of Acromegalia, by Mr. RANSOM. (*Brit. Med. Journ.*, June 8, 1895.)

Mr. Ransom has had occasion to observe two typical cases of acromegalia. In both cases the first symptom of the disease was amenorrhœa, and both presented characteristic ocular disturbances in the form of more or less complete temporal hemianopsia, complicated in the second case with a central scotoma of the right eye.

In the first case, the patient was forty-two years old. She now has the characteristic symptoms of uncomplicated acromegalia, namely, enlargement of the nose and of the inferior maxilla, swelling of the lower lip, and considerable enlargement of the hands and feet (wears now a No. 7 shoe, where she formerly wore a No. 4).

Vision of both eyes is considerably reduced; the patient can only read large characters with the aid of very strong convex glasses. The visual fields are of the following form: There is a scotoma on the temporal side of both eyes in the form of a crescent, the concave portion of which surrounds the point of fixation at a distance of 30° from this in the right eye and 40° in the left. The corneæ of the crescent reach below the vertical passing by the point of fixation, and they extend upward considerably beyond it. The convex side of the crescent is confused with the external limits of the visual field.

The optic discs are pale, and their contours irregular.

The second patient is thirty-four years old, and has noticed an enlargement of the feet for five years. Since the age of twenty-two years she has only menstruated twice. In addition to the characteristic symptoms of acromegalia, the patient has those of sugar diabetes. The optic nerves present the appearance of commencing atrophy, more pronounced in the right than in the left eye. Vision is $\frac{1}{12}$ in the left eye, and less than $\frac{1}{10}$ in the right.

Perimetric examination shows a temporal hemianopsia with concentric narrowing of the nasal portions. In the left eye the line of separation surrounds the point of fixation at a distance of about 5° . In the right eye there is a central scotoma separated from the blind part of the temporal portion by a zone in which light is feebly perceived.—S.

A Case of Acromegalia with Bitemporal Hemianopsia and Sugar Diabetes, by Dr. MARINESCO. (*Soc. de biologie*, Session of June 22, 1895.)

Dr. Marinesco presented a patient thirty years old, suffering from

acromegalia and sugar diabetes. Until she was twenty-two years of age, this woman had had attacks of epilepsy, which occurred at first three or four times a week, and afterwards at longer intervals. Five years ago she had a fainting fit and fell from the second story. Six months after this accident, she noticed that her feet had increased in size, and later, her hands, face, and breast began to develop abnormally. About the same time her courses ceased. Finally, three years ago, the patient became strabismic, polyuric, and lost her strength.

She now presents a classical picture of acromegalia: the hands and feet are transversely enlarged, the face has assumed an enormous development, and the lips and tongue are voluminous. No sensory disturbances are found in the patient. All the senses are normal except that of sight. Examination of the eyes shows the existence of bitemporal hemianopsia; there is no hemiopic reaction. —S.

Retinal Hemorrhages Caused by the Use of a Bicycle,

by Dr. CLAVELIER. (*Archives med. de Toulouse*, No. 7, April 15, 1895.)

In a race of 12 kilometres a very rapid pace was taken in the last four, and one of the men, thirty-two years old, was seized with severe palpitations, which had scarcely terminated when there was a sudden diminution of vision of the left eye, falling to $\frac{1}{4}$, while the right eye remained normal.

Ophthalmoscopic examination showed traces of numerous hemorrhages.

Examination of the heart was negative, and the urine was perfectly normal. There was no rheumatic, syphilitic, or alcoholic history; no anæmia, and no lesions of the digestive organs.

The evident cause of the hemorrhages was, then, the bicycle race.

This case is similar to one described by Le Gendre, who found intestinal hemorrhages in a child twelve years old, as the result of a bicycle excursion.

Phlyctenular Affections of the Eye, by Dr. MIQUET. (*Société de thérapeutique*, March 13, 1895.)

The following treatment is recommended by the writer:

Complete irrigation of the eye and of the conjunctival culs-de-sac every day, employing a lid-elevator and a $\frac{1}{1000}$ solution of sublimate.

Tear away the crusts of impetigo wherever they are found, without

fear of bleeding, using tampons of cotton soaked in mercurial solution.

If there is iritis, a drop of atropine.

After each disinfection apply a dry bandage; if a severe catarrh appears, the bandage should be omitted and the eye left uncovered. .

When the patients are uncleanly children, with numerous crusts and considerable blepharospasm, the treatment is modified in the following manner: Each eye is anæsthetized by the instillation of a few drops of cocaine; the entire peri-orbital region, the root of the nose, and the lids, and especially the ciliary borders, are thoroughly washed with soap and water. Irrigation of the entire region with a $\frac{1}{1000}$ solution of sublimate. A dry bandage, renewed each time.—V.

Sub-conjunctival Injections, by Dr. BJERRUM. (*Med. Tidsskrift*, 1894.)

The author recommends sub-conjunctival injections of salicylate of soda in punctate keratitis. Van Moll (of Rotterdam) has also obtained good results with these injections in cases of scleritis and diffuse keratitis.—ERIKSEN.

V.—MISCELLANY

CORRESPONDENCE

The following communication has been received from Dr. Darier in reply to Dr. Arnold's letter published in the June *Annales* (p. 454).

I have just read the description of the case mentioned by Dr. Arnold; it read as follows: "1882, double iridectomy above for imminent glaucoma as the result of pupillary occlusion from iritis. With a lens, small vessels could be distinctly seen going from the lower border of the iris toward the anterior capsule and toward the pupillary membrane."

This is all there is in the observation which relates to vascularization of the pupillary membrane. But in the case which I described, and which I followed for four years, there was never a pupillary membrane. I at first thought that the new vascular formation was caused by an unperceived exudate. But when I saw the fine network develop progressively in the patient's other eye, and extend both toward the centre of the pupil and laterally, I was able to see with

high magnification (+ 32 D) that the vascular loops from the border of the iris developed on the anterior capsule in parts where it was impossible to find the slightest exudate or pigmentary deposit. I then presented the patient to the Ophthalmological Society of Paris, and most of my colleagues found, as I did, that there was not in this case a vascularization of a *pupillary membrane*, such as is frequently seen in inflammatory occlusions of the pupil, vascularizations which may sometimes be seen with the unaided eye, because they encroach upon the obliterated pupillary field. Furthermore, Dr. Leplat has described two such cases in the *Annales* for March, 1895 (Correspondence).

In the other eye the vessels did not disappear after iridectomy, but became simply shrunken and slightly atrophied. Furthermore, it was this which led me to perform iridectomy a month later on the second eye, but not in the region of the vessels, since I prefer to perform an iridectomy above. The vascular arborescence is still visible, appearing like large shrubs broken by the wind. It is certain that they originated in the iris; it is more than probable that they followed an inflammatory process in the iris. But it is presumptive to state from this, as Dr. Arnold does, that it was a vascularization of a *pupillary membrane*, especially since there was no membrane, as in the two cases which I reported.—DR. A. DABIER.

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

HYSTERICAL CHROMATISM

By Dr. **P. PANSIER** (Avignon).

The chromatic affections which may be encountered in the eyes of the hysterical may be arranged in two groups: apparent affections and latent affections.

APPARENT AFFECTIONS.—These consist in blindness to one or more colors. (*Traité de l'hystérie*, 1895.)

Gilles de la Tourette, extending the theories of Landolt concerning the amblyopia which accompanies cerebral hemi-anæsthesia to hysterical amblyopia, explains this achromatopsia by the concentric contraction of the visual fields. "The various circles which in the exploration correspond to the limits of vision for each color contract concentrically in a manner more or less accentuated, following the law recognized for the normal condition." This contraction will cause, first of all, the disappearance of the perception of green, the field of which is normally the narrowest. This will be followed by the abolition of the perception of red, and the vision for blue will persist to the last.

However, it is not always so. Landolt and Charcot have recognized that there are two series in the order of the disappearance of colors in hysterical cases: the blue series and the red series. In the first series blue is the latest color perceived; in the second, it is red.

The explanation given by Gilles de la Tourette will not be, then, applicable to cases coming within the first category.

Other facts, furthermore, forbid us to accept this theory without restriction.

If it is admitted that the achromatopsia of hysterical amblyopia may be produced by and in proportion to the contraction of the concentric colors, here is what must happen: the limits of the visual field for green extend to about 30° , and when the limits of the field for white (the least limit of which we may fix at 75°) are contracted to 30° the perception of green should be abolished. That is to say, that whenever the visual field for white is restricted to about 45° there should be achromatopsia for green.

But such a deduction is absolutely false. I have now under observation the visual field of an hysterical subject; the limits for white were less than 15° , yet the chromatopsia is normal; all the colors are perceived. By the side of this I may place the visual field of another hysterical person, in which case the contraction of the field has scarcely reached to 50° and the perception of green is abolished.

We shall find the explanation of these contradictory facts in the second series of chromatic troubles which I have called latent affections.

LATENT AFFECTIONS.—These require to be examined with greater care: they are not as rare as achromatopsia, but they are almost constant in hysteria.

Physiologically, we know that the sensibility of the retina diminishes from the centre to the periphery for white, as it does for colors. At the extreme limit there exists a zone where white alone is perceived; then comes a zone which is sensible to blue; further within we find a zone sensible to red, and finally, a more central zone which has perception of green. Examining the sensibility of the retina with the perimeter, we find that the visual field for the colors arrange themselves in the following order: (1)

(1) Examinations of a large number of normal eyes have given these average limits. The colors which I have used, and which I continue to use in my researches, are, I recognize, impure colors: they are not invariable, nor have they the same white value. But it has not been my object to determine the peripheric visual acuity of the retina for colors. I recognize but one thing, which is, that while with the colors which I use for the normal eye the color visual fields arrange themselves according to the classical limit, in hysterical cases the results are entirely different.

	White.	Blue.	Red.	Green.
Above.....	55	45	40	30
Below.....	70	60	50	35
Nasal.....	60	55	45	30
Temporal.....	85	75	60	45

In the hysterical, this order no longer exists: the color visual fields are no longer in their respective places; their limits are inverted and altered to such an extent that, should one express these perturbations by a general formula, it would be necessary to say that in the hysterical subject the characteristic of the color visual field is disorder.

The only groupings into which these forms may be combined are the following:

First Group.—White remains the peripheral color: the circles of color contained within its limits are slightly related or in disorder.

Second Group.—White is no longer the peripheric color: it is either the red or blue, exceptionally the green, the limits of which are widest.

This classification is absolutely relative, and it may be repeated of these chromatic troubles, as of all the disturbances of hysteria: it is a physiological disorder.

Leaving these facts and this recognition of the visual field of hystericals, we may return to the theory of Gilles de la Tourette, and admit that in nervous amblyopia the visual circles are retracted, and that there comes a time when the innermost circle disappears and vision for that color is abolished. But as in hysterical cases the innermost circle is not always the same we may see all varieties of achromatopsia produced.

Thus we may explain why, in nervous amblyopia, it is not always the same color which is the last to be perceived, and that according to the order in which they are arranged (an order variable with each hysterical case), we shall have the persistence of this or of that color—the color the visual field of which is most extended.

Do the different color circles contract proportionally? Of this I am not so sure. Who can tell us that in hysterical

amblyopia the disorder of the color circles is not exaggerated for this color or diminished for another ?

I am obliged to admit that this may be the case when I compare some visual fields in hysterical cases with their former condition, or with their visual field when in hypnotic condition.

I find in these observations that the visual field, when the patient is awake, is not identical with the visual field in the state of hypnosis.

Putting aside the considerable clearing up which I observe in the visual field in hypnotic state, I examine only the order of the color visual fields.

In a case which we will take as an example, I find in the waking state a visual field contracted to 15° with the red at the periphery. In the hypnotic state the red has become the central color : the relations of the white and of the blue remain the same, their circles overlapping one another. There is in this case achromatopsia for green and violet.

Does not the neurosis here appear to involve the colors differently ?

It attacks, in the first place, the green and violet, the conscious perception of which it abolishes ; it then attacks the blue and the white, the limits of which it restrains considerably ; it involves less the red, which becomes the peripheric color.

As the amblyopia increases, the visual circles are contracted, and the red remains the last color perceived : we have fallen upon a case in the red series. If it is not too great temerity to judge from the visual field in the hypnotic state, the red was not the peripheric color in the normal state of this subject. This case, then, would be inexplicable by the theory of proportionally concentric contractions. Is it not more rational to admit that the concentric contraction of the colors is not proportional, and that one color may be involved more than another ?

Beyond these experimental facts, other facts demonstrate *a priori* that the visual field of colors in the hysterical may not be identical with the normal type. It is admitted in France that hysterical achromatopsia is psychic : the retina receives the impression, the visual cortical centre perceives it, but the

imagination of the hysterical subject neutralizes the image. The perception is incomplete ; it is sub-conscious. But if in the hysterical subject the visual field for colors necessarily assumes the normal type, we should find a series of inexplicable facts.

I have taken the visual field of hysterical achromatopes for one color. I have found that the visual field of the color not perceived is sensibly confounded with the visual field for white. I should add that in these cases I had recognized by perimetric examination the settling down of the color circles the one upon the other—that is to say, that the limits of sensibility for white and for colors was very nearly the same.

But in the hysterical subject the blindness is psychic : the retinal impression is received as if the color were really perceived ; the retinal function is intact ; it is in the superior centres that a trouble of transmission operates.

Then, if we take the visual field for green (choosing the achromatopsia of green as an example), we should find the green, although not cerebrally perceived, occupying in the retinal impression its habitual place—that is to say, stopping at about 30°.

However, I find that the circle for green is confounded with that of white.

How are we to explain this fact otherwise than by this inversion of colors which we have already recognized by the perimetric examination ? The limits of the perception of green should in this subject be confounded with those of the perception of white. The retinal perception is made as if the achromatopsia did not exist, and the perimetric examination should indicate to us the limits of sensibility for green as if that color were perceived ; if it shows to us the circle of green confounded with that of white, it is because that is its place, abnormal for the healthy subject, but not for the hysterical.

In congenital achromatopsias or those due to a commencing sclerosis of the nerve, things do not proceed in this manner. The color not perceived is seen as dirty gray ; in the visual field it occupies an intermediary place between the white and its physiological place : it gives by the perimetric examination a

circle identical with that which a gray test square of the same intensity would give us, but it never attains the limits of the white.

Confounding the achromatopsia resulting from the sclerosis of nervous fibre with psychic achromatopsia of neurosis, Knies (*Annales d'Oculistique*, 1894, T. CXI., p. 38) has adduced a new theory of hysterical amblyopia: he generalizes it with all the troubles of neurosis.

Knies sees in amblyopia a cerebral trouble of the vaso-motor innervation. A vascular dilatation is produced at the point of the optic foramen which, acting by mechanical compression, "could produce at this point a displacement of the myeline, and by this means diminish or destroy the conductivity of the nervous fibres without destroying them. The almost immediate return of the function is explained in the same manner."

Knies supposes, in the first place, that "the dyschromatopsia of hysteria is analogous to that encountered in optic atrophy." This is inadmissible. If we take an hysterical achromatope for green, for example, and we turn before her eyes a disc composed of green sectors and of red sectors—colors which are complementary—when the disc is in rotation, the colors become superimposed and our eyes will perceive the disc as white.

The hysterical subject in this case recomposes the colors as if there were no achromatopsia, and perceives the disc as white, as do we ourselves. On the contrary, if we cause the disc to turn before a subject in whom the achromatopsia is consecutive to a commencement of sclerosis of the nerve, the colors are not superimposed, and the disc will be seen as red.

And this is only one of many classic experiments which demonstrate that in the hysterical a sub-conscious perception may, under certain circumstances, become a conscious one. Is any such thing ever observed when the non-transmission of the perception is due to sclerosis of the nervous element?

"With the perimeter, the fields for red and green are found considerably contracted; those for yellow and blue are less affected. In the more advanced cases, the perception of red and green is abolished."

This is in contradiction with observed facts, which show us that red is frequently the last color perceived.

"The dyschromatopsia is usually proportionate to the decrease of visual acuity or to the contraction of the visual field." Here are some cases of hysterical amblyopia arranged in a table: it seems to me that they do not permit of any such hypothesis:

No. 1.	OD, V= 4/50,	Visual field contracted to 15°,	Chromatopsia = normal.
	OG, V= 4/50,	30°,	— normal.
No. 2.	OD, V= 1/100,	0°,	— blindness for green, yellow, and red.
	OG, V= 1,	40°,	— normal.
No. 3.	OD } V= 2/15,	15°,	— blindness for green and violet.
	OG }		
No. 4.	OD, V= 1,	45°,	— normal.
	OG, V= 2/15,	15°,	— blindness for green.
No. 5.	OD } V= 1,	45°,	— blindness for green and yellow.
	OG }		
No. 6.	OD, V= 1,	45°,	— normal.
	OG, V= 0,	0°,	
No. 7.	OD } V= 1,	15°,	— normal.
	OG }		
No. 8.	OD } V= 4/50,	normal,	— normal.
	OG }		
No. 9.	OD, V= 1/200,	0°,	— red only is perceived.
	OG, V= 1,	normal,	— normal.
No. 10.	OD, V= 1/200,	0°,	— normal.
	OG, V= 4/20,	normal,	— normal.

Is the dyschromatopsia proportioned to the decrease of the acuity? Nos. 1 and 8 have an acuity of $\frac{4}{50}$ and chromatopsia normal. No. 10, which has only an acuity of $\frac{1}{200}$, perceives all the colors. In contrast with this, No. 5 has normal acuity, and is an achromatope for green.

Is the dyschromatopsia proportioned to the restriction of the visual field? Nos. 1 OD and 2 OG have the visual field contracted to 15°, and the chromatopsia is normal. No. 10 OG, the visual field of which is no longer measurable, distinguishes all colors equally. No. 5, the visual field of which is contracted to only 45°, is already an achromatope for green and for yellow.

Knies recognizes the fact that among the hysterical the faculty of orientation is preserved notwithstanding a consider-

able restriction of the visual field. But in a type of sclerosis of the nervous apparatus which, like the neurosis, abolishes peripheric vision—in pigmentary retinitis, for example—does anything analogous exist? No, and we will see these unfortunates preserving a central vision intact or nearly so, incapable of guiding themselves, stumbling at all obstacles, while the hysterical subject with the same restriction is in no way incommoded in walking.

I do not believe that it can be claimed that the troubles observed in hysterical amblyopia are analogous to those recognized in cases of sclerosis of the optic nerve. I cannot, then, admit the theory of Knies which rests upon similitudes so problematical.

That hysterical amblyopia may be a cerebral trouble of the vaso-motor innervation is possible, but that this trouble is localized at the optic foramen, and that it produces the ocular phenomena of hysterical amblyopia by compression of the nervous fibre, is inadmissible.

From a practical point of view, can we gain any advantage from an exact knowledge of the chromatic troubles of hysteria?

I cannot do better than to base my reply upon the facts.

On November 23, 1893, one of my colleagues sent to me a girl of twenty years, anæmic, presenting in the left eye nervous troubles recurring in crises of greater or less extent (from a few minutes to several hours). These crises commenced by a violent peri-orbital pain with inability to open the contracted eyelid. Treatment with antipyrine and with bromides had been instituted without result. The only hysterical symptom detected by a general examination is a diminution of the pharyngeal reflex.

Upon this single hypothesis it was difficult to construct a diagnosis of hysteria. Nevertheless, recalling how frequently blepharospasm is the first manifestation of neurosis, I made the methodical examination of the eye: vision and accommodation normal, émmetropia; conjunctival hypoæsthesia.

The visual field is slightly restricted with inversion of the color circles, which are arranged in the following order: white, red, blue, green. I then felt myself authorized to con-

clude the diagnosis of tonic hysterical, blepharospasm intermittent and painful. Some séances with static electricity (a treatment in which suggestive action predominates) led to permanent cure. This raises a question: Is this chromatic trouble of the color visual fields peculiar to hysteria, and is it not encountered in other cerebral lesions?

April 29, 1894, I examined a patient aged forty years, for whom, in 1888, Professor Grasset (Montpellier) had made the diagnosis of "Jacksonian crises with right hemiparesis consecutive to a focus of meningo-encephalitis in the left hemisphere." Some time after, there appeared a convergent strabismus OD. which, at the time of my examination, had disappeared. I found: OD, chronic intermittent blepharospasm. $V = \frac{2}{16}$. Micropsia. The patient has had formerly monocular polyopia. At the examination the polyopia did not appear except as a red glass was placed before the eye. The field of vision of that eye could not be determined, all fixation being impossible to the patient.

OG, $V = \frac{4}{16}$; micropsia; monocular polyopia.

Visual Field.	White.	Blue.	Red.	Green.
Temporal... ..	25	35	45	12
Nasal.....	25	30	25	12
Above.....	25	20	15	12
Below	20	25	20	12

Here, then, is a patient in whom a syphilitic cerebral lesion induced a trouble, an inversion of the visual fields of colors analogous to that of hysteria; an objection presents itself that the syphilis in this subject may be engrafted upon hysteria.

Some days after, there presented for my examination a man of fifty-two years, who, five years ago, as the sequel of an apoplectic attack, had had complete paralysis of the right side.

The hemiplegia did not disappear until a year after the attack, and under the influence of appropriate treatment. His vision, each eye, was $\frac{1}{16}$; fundus of the eye anæmic.

Visual Field.	White.	Blue.	Red.	White.	Blue.	Red.
OD. Temporal.....	55	70	75	OG. 75	70	70
Nasal	50	55	55	45	35	45
Above.....	35	45	45	40	35	35
Below.....	50	55	55	55	55	55

I was struck by this enlargement of the visual field of the left eye for red, and I repeated my experiment. I placed the red test square at 75° externally and assured myself that the patient distinguished it. If, then, I substituted a white test square for the red, the patient no longer perceived it. In order that this white test should be perceived, it was necessary that I move it to 55° . My results were thus verified in all directions, and I assured myself that the patient perceived the red much further than the white. It is unquestionable that the limits of peripheric perception are, in this case, more extended for red than for white.

Here, then, is a case in which, excluding any cause imputable to hysteria, we find as clearly as possible this inversion of the color visual fields.

In this patient the visual fields are primitively in their classic positions (at least we are authorized so to believe). Under the influence of a cerebral lesion we find this chromatic trouble, which consists of the inversion of the visual fields—namely, an unequal contraction. The white is more involved than the red, which becomes the peripheric color; the blue, less involved than the white, is placed between the circles of the two. A cerebral lesion is then capable of producing a concentric contraction, but not a proportional one. Have we not here an argument in favor of the theory which I have announced in regard to hysterical amblyopia—that the concentric contraction is not necessarily proportional, and that one color may be more affected than another?

What are we to conclude from these investigations? Nothing especially new. We are to search for the causes of the ocular troubles of hysteria elsewhere than in the optic conductors, and we are not to localize their origin either at the optic foramen or at any point in their course. We shall find the seat of the lesion in the cerebral centres, and it is there that we are to search for the origin of these troubles. The fact of finding chromatic troubles absolutely similar to those of hysteria in clearly defined cerebral lesions is a further argument in favor of the cerebral localization of the necrosis.

THE STATISTICS OF TRACHOMA

By Dr. **E. Van MILLINGEN** (Constantinople).

Being charged with the task of gathering documents relative to forming a statistical table of trachoma, I wish first to express my thanks to all my correspondents, whose opinions will be read, and who have thus procured for me the means of successfully accomplishing my work.

The principal importance of these statistics rests in the letters from these correspondents, and I therefore reproduce them here.

I have reached the following conclusions from this study :

I.—Trachoma is an infectious and contagious disease which predominates in uncivilized countries and tends to disappear with the progress of civilization and of hygiene. Hygiene and cleanliness are the best preservatives against trachoma.

II.—Trachoma is not influenced by altitude; it may spread wherever the people are uncleanly and live in poverty, quite as easily at altitudes of from 1,000 to 5,000 metres as on plains.

III.—All races are equally susceptible to the virus of trachoma. An immunity for certain races does not exist.

I.—Not only in certain countries, as Egypt, Syria, and Finland, where trachoma is endemic; it is met with almost everywhere, as well in the polar circles as in the temperate and equatorial zones.

Examples: Peninsula of Jalmal, Algeria, Senegal, maritime provinces of Oriental Russia. It exists in :

Europe.—France, England, Germany, Spain, Italy, Austria, Roumania, Servia, Bulgaria, Turkey, Finland, The Netherlands, Russia, and Heligoland.

Asia.—Asia Minor, Persia, Afghanistan, Hindostan, Central Asia, China, Japan, Syria, and Arabia.

Africa.—Egypt, Tunis, Algeria, Morocco, Senegal, on the borders of the Niger, in the Soudan, and in Abyssinia.

America.—The United States, Brazil, Mexico, English Guiana (the negroes of Essequibo), Havana, and among the Indians of the Rio-Negro.

Australia.—Among the Bushmen.

The majority of physicians are in accord on one point—namely, that trachoma is ordinarily met with among the poorer classes and in unhealthy and uncleanly individuals. The well-to-do classes are rarely attacked.

Examples: the peasants of Sicily (Faverini); the fishers of the province of Algarve, in Portugal (Gama Pinto); the dwellers in huts of the peninsula of Jalmal, and the poor of all great cities. In Astrakhan trachoma is twenty-five times more frequent among the Tartars than among the Russians (Dalinger). According to Schjepotyew, there are 3 trachomatous subjects in every 10,000 Russians, against 10 in every 1,000 Tartars, etc.

The relation existing between the frequency of trachoma and the social and intellectual conditions of various peoples cannot be better illustrated than by the following table, which shows, on the one hand, the proportion of trachoma, and on the other the proportion of illiterate in the same country:

Frequency of Trachoma in Relation to the Number of Ocular Diseases.		Country.	Frequency in Relation to the Population.
0	...	Sweden.....	0.23 %
0	...	Norway.....	0.23 %
0	...	Denmark	0.25 %
0	...	Germany.....	0.85 %
0	...	Switzerland.....	1.20 %
7.05 %	...	Holland.....	4 %
0.7 %	...	Scotland.....	15 %
0.07 %	...	England.....	6 %
3	%...	Ireland	28 %
3	%...	America	25 %
4	%...	France.....	28 %
4	%...	Belgium	32 %

Frequency of Trachoma in Relation to the Number of Ocular Diseases.		Country.	Frequency in Relation to the Population.
0	...	Austria.....	2-3 %
12	%...	Hungary.....	42 %
20	%...	Bulgaria.....	44 %
25	%...	Greece.....	45 %
25	%...	Italy.....	47 %
25	%...	Portugal	56 %
11.09	%...	Spain	58 %
52	%...	Roumania.....	68 %
10 to 25	%...	Russia.....	30 to 76 %
50	%...	Africa	85 %
18	%...	Turkey.....	60 %
45	%...	Central Asia....	90 %

It is, of course, understood that these figures are approximate. In Austria, for example, I have estimated the illiterate at $\frac{1}{3}\%$ against 0 trachoma. The idea which I wish to express in principle is that in the parts of Austria where there are only $\frac{1}{3}\%$ of illiterate there is practically no trachoma. But, going a little more into detail, we will see that there also the number of trachomatous persons is in proportion to the number of illiterate. The following table will show what I wish to make clear:

Frequency of Trachoma.		Provinces.	Illiterate.	
10 to 15	%....	{ Bukowina	80 %	
		{ Dalmatia.....	80 %	
		{ Galicia.....	70 %	
		{ Istria	63 %	
		{ Goritz.....	42 %	
4.3	%....	{ Carniola... ..	40 %	
		{ Carinthia.....	31 %	
0.03	%....	Styria.....	22 %	
0.03		Trieste.....	21 %	
0.05	%....	Salsbourg	10 %	
Almost exclusively among Polish Jews.		9	%.... Silesia	9 %
		0.07	%.... Tyrol.....	8 %
		0.5	%.... Upper Austria	9 %
		12	%.... Hungary	42 %

The high proportion of trachoma in Galicia, Holland, and Roumania should be attributed to the great number of Jews, among whom this disease has always been very extensive, not from any racial predisposition, but rather on account of their lack of hygiene and cleanliness, and on account of their more or less Asiatic habits. Jews of the well-to-do class suffer no more from trachoma than the well-to-do classes of other nationalities.

II.—The opinion of some authors that trachoma is not propagated in countries of a higher elevation than 200 metres seems to me to be erroneous. The frequency of trachoma in the high plateaus of Asia Minor (Erzeroum (Armenia), Van, etc.), of Persia and of Central Asia, of Algeria and of Libia, indicate that this disease may be easily propagated in localities situated from 1,500 to 5,000 metres above the sea level. According to Dr. Emil Bock, the frequency of trachoma in Carniola is in the proportion of 6% of the total number of eye diseases. "Upper Carniola," says he, "traversed by high mountains, is not exempt from trachoma." In an admirable article on the extent of trachoma in Algeria (*Annales d'Oculistique*, July, 1894), Dr. Viger states that trachoma is quite as frequent on the steppes of the high plateaus of Algeria as in the plains, and that it even exists at elevations of from 1,200 to 1,500 metres. Dr. Treacher Collins, who lately travelled through Persia, assured me verbally that trachoma was very common in all of Iran, and especially so in the little villages situated on the highest mountains of Persia. It was while crossing the chains of Koich-i-Kena, between Chiraz and Ispahan (in Farsistan), that he was a witness of the great frequency of trachoma. The poverty and uncleanness of the inhabitants of these villages are beyond all description, and it is in just such countries that trachoma spreads with the greatest facility. These are trachomatous countries.

III.—The great extent of trachoma among such different races indicates that immunity is improbable. In any case, no conclusion can be drawn on this point from studying trachoma in Europe alone. For a definite statement on this subject it

would be necessary to follow its distribution in all the countries where it exists. My work is only a feeble effort to attain this object. But I am rather inclined to the opinion that apparent immunity is the result of individual resistance, from more perfect hygiene or from favorable circumstances which render contagion less easy.

It has been supposed that negroes are endowed with immunity against trachoma. I have found here at Constantinople that the proportion of negroes thus affected is very high (24% of the ocular diseases). The total number of negroes in Constantinople is about 4,000. There are two classes of negroes here : the eunuchs in the harems and the laboring class. The former live like their masters, and in surroundings where trachoma does not exist, as is the case among all well-to-do classes ; the latter share the misery and uncleanness of the poorer classes. These are frequently attacked with trachoma, while the former are rarely disturbed, in spite of the fact that their number is much greater than that of the poorer negroes. Professor Gama Pinto states that at Lisbon and at Rio de Janeiro he has seen several negroes affected with trachoma with all the characteristics of this disease, such as pannus, atrophy of the conjunctiva, etc. He adds that Dr. Moura, an oculist of Rio de Janeiro, told him that he had frequently seen negroes suffering from trachoma. Dr. Charles Finlay (of Havana) writes me that he has rarely had occasion to see trachomatous negroes ; but this may be explained by the fact that trachoma is rare in Havana, even less frequent than in France. Dr. Santos Fernandez, however, has gathered very careful statistics. He has found 660 trachomatous persons in Havana, among a population of 1,010,000 whites (00006%), and 10 among 460,000 negroes (00002%). The race of mulattoes is, in his opinion, equally susceptible to the virus of trachoma. Dr. Knapp (New York) finds that the negroes suffer quite exceptionally from trachoma. Dr. Lucien Howe (Buffalo) states that he has never seen a typical case of trachoma among the 3,000 to 4,000 negroes inhabiting that city. But these negative observations cannot refute the fact that trachoma may attack the conjunctiva ;

they simply tell us that the negroes of those countries do not suffer from it. There is nothing extraordinary in this fact, considering that the rest of the needy population of which the negroes are a part are not often troubled with trachoma. "It is principally among the Italian and Polish immigrants," adds Dr. Howe, "that trachoma is most common." The negroes form a part of the old American population long established in the country, who enjoy the benefits of more perfect hygiene.

It seemed to me at first that the Tziganes in Turkey were rarely troubled with trachoma. More extensive investigations enabled me to discover that the Tziganes who lead a nomadic life and exercise the professions of basket-makers and smiths are almost entirely free from trachoma, while the Tzigane public women who wander about the country, communicating freely with the soldiers and villagers, are often subject to it. The same fact has long been observed in connection with the Bedouins of the desert. As long as they remain away from Egypt, where trachoma is so common, they are free from it. According to Creissel (*Medical Topography of Ouargla*), Egyptian ophthalmia is very common at Ouargla, an oasis situated 800 kilometres from Algiers. *Cæteris paribus*, the neighboring nomadic tribes suffer much less from it than the inhabitants of the oasis.

All these facts clearly prove that two factors are indispensable to the propagation of trachoma: 1st, *contagion*; 2d, *defective hygiene*. Contagion alone is not sufficient to produce an extensive epidemic of the disease; it must be seconded by bad hygiene, uncleanness, crowded living, and a sedentary life. Continual change of place and air kills epidemics of trachoma. Uncleanness and crowded living seem to increase its virulence.

I will now give the letters in which my honored colleagues have kindly replied to my inquiries:

Replies:

Professor *Everbusch* (Erlangen, Germany).

Consult the reports of Sattler and Chibret to the Tenth Interna-

tional Medical Congress, for which I furnished some information. I may say that in this country trachoma is seen almost exclusively in the poorer classes. The disease is more frequent among women. The number of my patients is not sufficiently great to serve as a basis for statistics. I cannot give you a positive opinion concerning the contagiousness of trachoma, as the material at my disposal is insufficient.

Dr. Faverini (Catania, Italy).

1st, trachoma is very common in the province of Catania; 2d, it is more frequent among the peasants; 3d, the chronic form predominates; 4th, trachoma does not appear to be contagious; 5th, it seems to me to be more frequent with men. This is probably because they avoid treatment, with the object of using their disease as an excuse to avoid military service.

Dr. Georges Borel (Neuchâtel, Switzerland).

Trachoma does not exist at all in the portion of French Switzerland where I live, and I think that it would be necessary to go as far as Bâle to find any autochthonic cases. I treat about a dozen cases each year, which are imported by Italian laborers who come to Switzerland to work during the summer. Trachoma recovers with marvellous rapidity here, and any treatment seems to succeed, while at Paris, which is infested with it, when I was Chief of Dr. Landolt's Clinic, our results were difficult, slow, and quite discouraging. I have never seen contagion here, in spite of the promiscuousness of the Italian laborers.

Dr. P. Sgrosso (Naples).

1st, the proportion of trachomatous persons is 75% (7.5% ?); 2d, trachoma is more frequent among the poor; 3d, the chronic form predominates, the acute form being rare; 4th, from my daily clinical observations trachoma is contagious; I have no bacteriological observations in support of this; 5th, the women are apparently more frequently attacked, because it is easier for them to frequent the dispensaries; 6th, we have no negroes, but at Alexandria and Cairo I have had occasion to see that it is quite common among negroes.

Dr. Sydney Stephenson (London).

Trachoma is very rare in Great Britain, with the exception of Ireland. Among the 14,000 children whom I have examined, I have only found 0.5% affected with trachoma. (It should be stated that

Dr. Stephenson distinguishes between trachoma and follicular conjunctivitis.)

Dr. *Abadie* (Paris).

Trachoma exists at Paris, but exclusively among the poorer classes, where it frequently assumes a severe and chronic form. The chronic form predominates. The fact that trachoma frequently attacks husband and wife, children, and persons living in common and who are of different constitutions, seems to me to prove that this disease is certainly contagious. Further proof is furnished in an irrefutable manner by direct inoculations on persons, in particular among ophthalmologists who treat such patients. The celebrated Italian oculist, Quaglino, received some of the secretion from granulations on his conjunctiva; he was attacked with trachoma, and it lasted until his death. Dr. Cuignet, of Paris, who discovered skiascopy, lost an eye in this way.

Professor *Michel* (Wurzburg, Bavaria).

Trachoma does not exist in the endemic form either at Wurzburg or in the neighborhood near or more distant (North Baden, North Würtemberg, Lower or Middle Franconia). Among the 5,000 or 6,000 patients whom I see annually, I only find a dozen cases of trachoma which come from other localities, or which are rather cases of follicular tuberculosis.

Professor *Haab* (Zurich, Switzerland).

In my field of observation (Eastern Switzerland) I see no cases of trachoma. The two or three cases which I observe in the course of the year come from foreign parts, and in spite of the fact that we are always exposed to the importation of trachoma, especially among the Italian laborers, the disease is not propagated in our population, a fact which leads me to think that it is closely confined by certain teleological conditions, but, at the same time, I do not deny its contagiousness. I have only observed trachoma among the poor.

Dr. *Emil Bock* (Laybach, Tyrol).

Trachoma exists in the sporadic and endemic form in Carniola. In the city of Laybach it is in the sporadic form, with the exception of epidemics in two orphan asylums and in the house of correction. It is very rare to see granulations among the recruits or the soldiers. Trachoma is more common in the districts of Gottschee (at

Laserbach in the endemic form) and Loitsch, and in Lower Carniola (at Mosttling, Tchernembl, etc.). *Upper Carniola, traversed by high mountains, is not free from it* (1). The material which has been used for these statistics comes principally from Carniola itself. A tenth of our patients are of foreign origin—that is to say, from Lower Styria, Croatia, or the Austrian side. The trachomatous patients are principally peasants. The chronic form is most common. Season has no influence on the disease. Trachoma is certainly contagious, and should be distinctly differentiated from follicular catarrh. Contagion is proved: 1st, by epidemics in prisons, schools, and families; 2d, by cases of direct contagion which are observed (see my article on trachoma, *Allg. Wien. Med. Zeit.*, XXXIV., 1889); 3d, by transmission of trachoma to localities where it does not exist by persons coming from places where the disease does exist. Example: at Gottschee by travelling merchants, who leave Gottschee, and after wandering about the world, return with trachoma and communicate it to their relatives; 4th, by the fact that in Southern Carniola trachoma has been imported in part by miners who have returned from America, where they have worked, or by carpenters returning from Egypt; 5th, because trachoma in the eastern part of Upper Carniola comes probably from Lower Styria (the disease is endemic at Lentsch). The western side of Upper Carniola has probably been contaminated from the coast.

Dr. *Gosetti* (Venice).

More than a third of the eye diseases are cases of trachoma. It rages among the common people and poorer classes. The chronic form is far the more frequent. Acute cases are not wanting, especially in the spring and autumn. The contagiousness of trachoma is, in my opinion, an incontestable fact, supported by more than thirty years' experience. I have often seen a child, infected at school, give granulations to an entire family. In an investigation which I made a few years ago in the day schools, boarding schools, and industrial establishments I gathered the following facts: In a house of correction for boys, through lack of proper medical examination, several individuals affected with trachoma were admitted. In making their toilet in the morning all the scholars used water

(1) It is important to state here that of the total number of patients there were 6.6 per cent. of granulations, but this high proportion is due to the epidemics in the orphan asylum and in the penitentiary in 1890. Without this epidemic the proportion would have been 4.3 per cent.—VAN M.

from a large basin, and several of them used the same towel. Very soon a large number of them began to complain of their eyes, and when I was called to see them I found that of the 300 boys in the Institute 200 had granulations of the lids, the majority in the acute form, the others in the chronic form. In a boarding school a young girl was admitted who, although it was not suspected, had granular lids. A short time after her entrance in the Institute 10 scholars were attacked with conjunctivitis which I found to be of granular nature. A child who had been in the country with a nurse was brought to me by her mother; I found well-developed granulations. In spite of my recommendations of caution, the mother returned five days after the first visit with her two other children, whose eyes were attacked with ophthalmia. At the end of a week the woman herself and her husband contracted the disease. At Venice the proportion of men and women attacked is about equal.

Professor *Herman Knapp* (New York).

1st, trachoma is very common in New York; 2d, it is principally the poor class which is affected; the majority are Jewish immigrants from Poland and Russia; 3d, the acute form is rare; season has no influence on it; 4th, in my opinion trachoma may be: (a) non-contagious. *Trachoma simplex*, infiltration of hyaline granules, which may be thickly disseminated through all four lids of an individual without the slightest inflammatory symptom. Radical expression, best performed by the aid of forceps with cylindrical rollers, cures these cases without the use of collyrium or crystals of sulphate of copper, etc.; or (b) contagious. *Trachoma complicatum sive consecutivum*, arising from catarrhal or blennorrhœic conjunctivitis. The cure of this form requires the use of chemical agents after mechanical treatment. This form is much more rebellious and produces more cicatrices than the simple form; 5th, sex has no influence on it; 6th, negroes are only exceptionally affected.

Dr. *van Millingen* (Constantinople).

Of a total number of 6,917 patients, 1,092 are affected with trachoma—that is to say, a proportion of 15.6%. My replies to most of the questions which I have addressed to my foreign colleagues are contained in the first part of my report. There remains only the question of contagion. I believe, with Dr. Knapp, that there are contagious and non-contagious forms, but in principle all cases of trachoma are contagious except when they are in the cicatri-

cial period. Trachoma is certainly transmissible if it is accompanied with secretions ; it is very difficult to be transmitted if there is no secretion. But what case of trachoma remains unchanged ? and are we in a position to foresee what case will not surprise us by the sudden appearance of secretion ? Thus, cases the most inoffensive in appearance may later become a source of danger. The factors which provoke secretions in granulations are uncleanness, dust, bad ventilation, and physiological wretchedness. In countries where these factors are reduced to a minimum there are very few acute suppurating cases of trachoma. There is only the chronic form without secretions. I could cite hundreds of examples of contagion. By acute trachoma I mean trachoma which starts on a healthy conjunctiva by a severe inflammation similar to an acute catarrhal ophthalmia. The majority of epidemics of trachoma in boarding schools and houses of correction are characterized by a similar acute condition in the scholars, one case following another until a majority of the scholars (sometimes 75%) are affected. The pre-auricular gland is frequently hypertrophied and very sensitive while the acute condition of the conjunctiva lasts. These acute cases are preceded by the appearance of several (5 to 10) hyaline follicles situated on the surface of the conjunctiva of the upper cul-de-sac, and the surrounding portion of the membrane is hyperæmic. When one acute case appears in a family it will certainly be followed by other cases. A case of chronic trachoma being introduced into a family, it is not necessarily followed by others ; but if it lasts long enough other members of the family will be affected, and such cases ordinarily start with an acute attack. The dangers of contagion will then be almost *nil* if the case (chronic trachoma) is treated with antiseptic irrigations, preferably with sublimate, and if the rules of hygiene are scrupulously observed by the members of the family.

Dr. *Schreiber* (Magdebourg, Germany).

In the part of the Province of Saxony near Magdebourg there is no trachoma. The few cases which I have seen here during the first ten years of my practice were exclusively observed among Polish laborers.

Dr. *Charles Finlay* (Havana).

1st. Trachoma exists here, though it is less extensive than in France or in the United States of America. 2d. It is most frequent among the middle and poorer classes, in adults of both sexes. I have observed some cases among soldiers and among the scholars of chari-

table institutions. 3d. The chronic form is most common, the acute form generally appearing as an aggravation in the course of chronic trachoma. 4th. I regard trachoma as decidedly contagious. In the period between 1858 and 1875 I was occasionally called to a public institution to treat children affected with trachoma. (R. Casa di Beneficencia de la Habana). It occurred there in the form of epidemics, which I attribute to transmission from some child who brought the disease to the institution. The bad arrangements of the lavatories, by towels, and the uncleanness of the wash basins, seemed to facilitate this transmission. Later on, measures were taken to avoid contagion from the lavatories, and Dr. Monlatoo, who is now physician and oculist to this establishment, tells me that trachoma no longer occurs with the same intensity as formerly. 5th. In the R. Casa di Benefic., cases of trachoma appear to be more numerous among the boys than among the girls. 6th. I have rarely observed trachoma at Havana among negroes.

Professor *Gallenga* (Parma, Italy).

1st. Trachoma exists in this country, where it formerly made great ravages after the wars of 1848-49 and 1859. In the city of Parma (50,000 inhabitants) and in the surrounding country, of 10,844 patients from January 1, 1889, to December 31, 1893, 1,541 of them had trachoma—that is to say, 14.20 per cent. There has been considerable improvement during the last three years. 2d. Trachoma is more common among the laboring classes of the city and among the farmers of some of the large villages on the plain near the river Po. 3d. Acute cases are frequent: they are succeeded by the chronic form. Season makes little difference; however, cases of trachoma are somewhat more numerous in winter. 4th. Trachoma is contagious by direct transmission from one person to another under favorable circumstances. 5th. The majority of cases are among females.

Professor *Gama Pinto* (Lisbon).

1st. The proportion of trachoma to other ocular diseases is 12.5 per cent. 2d. Trachoma is more prevalent among the indigent classes. It is most frequent in the Province of Algarve, where it also occurs in the middle classes. At Lisbon it is most prevalent among the class of fishermen and venders of fish. Entire families among them are attacked with this disease. They constitute a distinct race, remarkable for their uncleanness, living in a separate

quarter, under bad hygienic conditions and in extremely crowded quarters. It is said that these people are the descendants of a Greek colony which formerly settled in the country. 3d. The chronic form predominates, but the disease frequently commences in the acute form, and then passes into the chronic. Both acute and chronic forms appear in all seasons, but they appear to me to occur more frequently in spring and summer. 4th. I consider trachoma contagious. I have met with well-authenticated cases of contagion from eye to eye and from patient to patient. Among the fishermen whom I mentioned, very young children, only a few weeks old, are found affected with trachoma, a fact which admits of no other explanation than the transmission of the disease by contagion. It may be objected that children, living in the same hygienic conditions as their trachomatous parents, might acquire trachoma spontaneously; but I know of persons well-to-do and in good hygienic conditions who have beyond doubt acquired trachoma. Among others, I may cite Professor Manz, of Freibourg, and the late Professor Horner, who caught trachoma from their patients. 5th. I think that the proportion is greater among women, although I can give no positive data. 6th. I have seen both here and at Rio de Janeiro several negroes affected with trachoma, with all the characteristics of the disease, such as pannus and atrophy of the conjunctiva. Dr. Moura, of Brazil, an oculist at Rio de Janeiro, assured me that he had seen many cases of trachoma among negroes.

Dr. Enea Ducci (Milan).

1st. The proportion of trachoma to other eye diseases is from 6 to 7%. 2d. It is most frequent among the poorer classes. 3d. The prevalent form is the chronic; acute cases are as frequent in winter as in summer. 4th. Trachoma is contagious by carrying the secretion from one eye to another.

Dr. Thomas Reid (Glasgow).

1st. At the Berkeley Street Clinic we have had in the last ten years 61,914 patients, with 319 cases of trachoma, or 5%. At the Charlotte Street Clinic there were in 47,778 patients, in the space of ten years, 310 cases of trachoma, or 6%. 2d. Trachoma is most frequent among the poor, and is very rare in the better classes of society. 3d. Chronic cases are those which are ordinarily met with, and, from time to time, a sub-acute case. 4th. Having had only isolated cases during recent years, I am not able to pronounce upon the con-

tagious or infectious nature of the disease. 5th. According to my statistics, the proportion between the sexes is five men to one woman. 6th. I have seen one or two negroes affected with trachoma; but negroes are very rare here.

Dr. *Lucien Howe* (Buffalo, New York).

1st. Trachoma exists here, being one of the most important diseases in our practice. 2d. Very few cases in private practice, but a considerable number in the lower classes, especially among Italians and Poles. There are here 18,000 Poles and 8,000 Italians, all immigrants. It is among these that we find trachoma. 3d. Chronic cases are the most frequent. There is a greater number of acute cases during the autumn and winter. 4th. Trachoma is contagious, a fact which is proved by : (a) its clinical history; I have seen 5 cases in a single house; (b) the results of recent bacteriological researches. 5th. The proportion in the sexes is very nearly equal. 6th. There are only 3,000 to 4,000 negroes here, but I have never seen a typical case in a negro, and one of my colleagues in Washington who sees about 1,500 to 2,000 negroes a year has assured me that he has never seen a case of trachoma in a negro. In my microscopical investigations I have found no difference between the microscopical structure of the conjunctiva of the negro and that of the white.

Dr. *Jules Mutermilch* (Warsaw).

I understand under the name of trachoma only the *chronic* affection which may develop as the result of any acute inflammation of the conjunctiva. Whenever, under unfavorable conditions, an acute conjunctivitis does not terminate rapidly, and consequently causes irreparable and important alterations in the adenoid tissue—in other words, whenever the anatomical character of the latter is so changed that it can no longer serve as a support for the mucous epithelium—the inflammatory process, from acute, becomes chronic. From the anatomical point of view, this chronic condition reveals itself by the gradual transformation of the adenoid tissue into compact tissue, and of the mucous epithelium into epidermoid tissue. Clinically, the chronic process is distinguished by the participation of the cornea, by the formation of pannus which is the immediate result of extensive alterations in the epithelial tissue. I have observed in a large number of cases, from clinical as well as from anatomical examination, that pannus only develops when there has been destruction of the superficial epithelium of the conjunctiva, and whenever this is restored

the corneal complication disappears. 1st. Trachoma is very extensive in our country, the number of cases of trachoma constituting about 10% of the number of ocular affections. 2d. Trachoma is met with almost exclusively among the poor and ignorant people. 3d. It is impossible for me to reply to this question, since I do not agree with what is understood by the expression "acute trachoma." 4th. The transition from the acute to the chronic process is not the result of any parasitic intervention, but depends upon individual and hygienic conditions. 5th. The proportion between males and females is almost equal. 6th. We have no negroes.

Professor *Dianoux* (Nantes, France).

Trachoma only exists in Nantes in a very small proportion. The peasants are almost entirely free from it. It is found, for the most part, among the needy classes, being very rare and, when it occurs, mild in form among the better classes. The chronic form is rare. Most of the acute cases occur in the spring and autumn. I consider trachoma as essentially contagious, but it may transmit a simple conjunctival catarrh to some and trachoma to others, according to locality and personal resistance. The trachomatous mother gives a follicular conjunctivitis to her child and catarrhal conjunctivitis to the father. I have twice been obliged to clear out my ward on account of a veritable epidemic. Trachomatous patients sent for treatment to the Hospital of Pen-Bron, situated near the sea, cease to be dangerous for others. Women are more frequently attacked. The granular conjunctivitis of Nantes has but a distant relation to the form which I have seen in The Netherlands, at Vienna, London, Paris, etc.

Dr. *Lagrange* (Bordeaux).

Trachoma is comparatively frequent among the poorer class at Bordeaux; it is extremely rare among the rich or the well-to-do. It is, properly speaking, an affection caused by bad hygiene, by which I mean anything which can cause the development of the lymphatic or scrofulous diathesis in a person. An exact idea of the extent of trachoma in our city may be reached from the fact that of the 2,000 new patients whom I see yearly in my dispensary practice 50 are affected with granular ophthalmia (2.5%). Among the rich or well-to-do class, who come to my private office, of the last 2,000 patients I have only seen 4 suffering from this disease (0.02%). These four patients were sickly, weak, and of a lymphatic disposition. The form

which predominates is the chronic. The affection rarely commences with purulence; however, I have seen this several times, especially in the warm season. One of my pupils was attacked with trachoma with a most acute purulent onset last summer after treating a large number of patients with purulent ophthalmia of blennorrhœic origin at the Children's Hospital. In the spring and autumn it is not rare to see old cases of trachoma become complicated with acute accidents, and especially with lesions of the cornea. I consider trachoma as very contagious, but in order that contagion shall take place, direct inoculation is necessary. Children of the same family and those who play together at school are easily contaminated; it is much more rare for adults to be affected by contagion, and I explain this by the fact that people of a certain age are much more careful about approaching affected people. Nearly all adults trachomatous from contagion are parents of children who have long been affected with the disease. I do not think that the *contagious germ* can be transported by the air, and I am firmly convinced that for proper development this germ needs a propitious soil. This soil is lymphatism. I have only observed two or three persons with granulations who were in perfect general health. Women and men are affected in almost the same proportion. Of 58 cases of granulations 26 were women and 32 were men. The true therapeutics of trachoma cannot be carried out without proper hygiene. With sufficient alimentation, pure air in all the quarters of our city, sunshine in all the residences of the poor people, less promiscuousness in living, and vacations in the country, in the mountains, or at the sea-shore, more or better could be done than is now effected with the various forms of topical treatment. The best treatment, in my opinion, is surgical treatment, which destroys the germ and its results *in situ*, but the soil remains prepared for the next seed, and recurrences spoil the statistics of our definite results in a most unsatisfactory manner.

Professor *W. M. Gunning* (Amsterdam).

You will find much that I have to communicate to you in the Transactions of the Ophthalmological Congress at Heidelberg, in 1885. It is strange that this communication has been ignored in recent literature. In the period 1875 to 1893, nineteen years, the number of patients received at the institution which bears the name of "Inrichtung für Oooglidiers," and which is attended by Drs. Juda, Rynbeck, Zitta, and myself, was 10,990. One-fifth of these patients were Jews, although the proportion of Jews to the popula-

tion of Amsterdam is only $\frac{1}{10}$. But the number of poor Jewish patients is much greater than that of other patients. Of the Jewish patients, 61% were affected with conjunctival diseases, while of the other patients there were only 24.6%. 35% of the Jews were trachomatous, while only 2.6% of the other patients were affected with trachoma. It is interesting to note that in spite of the continual increase in the number of patients coming to the polyclinic, the number of conjunctival diseases and cases of trachoma has decreased both among the Jews and among the other nationalities. Among the Jews, the conjunctival diseases have decreased from 74% to 37.4%, and trachoma from 38% to 25%. Among the other nationalities, the corresponding figures are from 30.4% to 4% for conjunctival diseases, and from 17% to 0.8% for trachoma. I attribute this frequency of conjunctival diseases and trachoma among the Jews to the fact that they inhabit by preference a separate quarter of the city, where, in spite of the salubrious situation of this quarter, they are under the combined influence of poverty, uncleanness, and crowding in unhealthy dwellings. There is no race predisposition, for—1st, the same frequency has not been observed at Rotterdam, which comes next to Amsterdam in the number of inhabitants and the size of the city, and 2d, because trachoma is never observed among the well-to-do Jews of Amsterdam. 3d. The preceding remarks will serve as response to your second question. 4th. I only recognize one form of trachoma—chronic trachoma. In my opinion, acute trachoma does not exist. The condition to which this name has been given I consider as an acute catarrh, or rather blennorrhœa, commonly with an increase in the size of the follicles, a condition which ordinarily pre-exists—in short, a follicular or blennorrhœic catarrhal conjunctivitis. 5th. I cannot accept the theory that trachoma is contagious, since in true granular trachoma there are no secretions, and, as is generally admitted, infection is not possible without the presence of fluid secretions. But experience has also taught me that trachoma is not contagious. For example: 1st. In an orphan asylum here containing five hundred children, twenty years ago 15% of the conjunctival diseases were cases of trachoma. On isolating certain cases (the catarrhs and light cases of blennorrhœa of the contagiousness of which there was no doubt) we succeeded, in ten years, in completely crushing out the epidemic, and that by simply adopting hygienic measures. It is true that the trachomatous individuals who were in the institution at the commencement left it when they reached the age of eighteen or twenty years, but it is important to note that there was not a new case of

trachoma among the new children received, in spite of the fact that some of these were affected with trachoma when they entered the institution. This asylum has always been inspected by me, and I see all the children at least once a year. 2d. Also in an orphan asylum for Jewish girls, with fifty children, in which I found 18% affected with trachoma, there has not been a new case since I took charge of the hygiene of this institution. I have frequently seen infections the origin of which has been attributed to cases of trachoma accompanied with purulent or mucous secretions. These cases, however, were never typical cases of trachoma, but rather conjunctival catarrhs or purulent conjunctivitis. 4th. Everyone has noticed that the mate of a trachomatous eye may remain healthy for many years. 5th. I examined a school in 1879, in company with Drs. Juda, Rynbach, and Gori, and we found that there were a large number of trachomatous individuals in the establishment. At the expiration of a year Dr. Rynbach found that there was not a single new case of trachoma among the scholars. Similar observations have been made by Cohn, and doubtless by many other physicians. In this respect my observations resemble those of Venneman (see *Annales d'Oculistique*, 1889). In brief, on the basis of a thirty-five years' experience, I may say that I am firmly convinced that trachoma is not essentially contagious. 6th. Trachoma is more frequent among women, at least among the Jews. The following statistics may serve to illustrate the frequency of trachoma in relation to age and sex: from the age of 1 to 12 years, males 45.2%, females 45.5%; from the age of 12 to 20 years, males 38%, females 48%; after the age of 20, males 36.4%, females 48%. The proportion among married women under the age of 20 is 51.4%, while among unmarried women it is 36.5%; that is, exactly the same proportion as among the men of the same age. The explanation of this interesting fact seems to me to be as follows: The Jewish married women are obliged to take a purification bath after each menstruation (these baths being adjoined to the synagogues and under the surveillance of the rabbi). It was formerly common, at least among the poor, to make several women enter the same bath one after the other. The rule also required that the head be plunged under the water. The same towel was then used, first to dry the body, and then the face. Having been assured by competent colleagues that affections of the genital organs (gonorrhoea and other affections) were common among the poorer class of Jewish women, it is proper to conclude that these bad conditions may easily be the cause of contagious affections of the conjunctiva and also of trachoma. Although I distinguish between true trachoma and purulent conjunc-

tivitis, I am inclined to the opinion that trachoma may be the result of the attenuated virus of blennorrhœa.

Dr. A. Abercromby (Cape of Good Hope).

Trachoma is unknown in this country. My father and brother, who have practised here for more than sixty years, have only seen a few cases in the colony.

Dr. Wicherkiewicz (Posen, Poland).

1st. Trachoma has long existed in the Grand Duchy of Posen. In 1891, of 3,948 patients with ocular diseases, 540 were trachomatous, of whom 120 had corneal complications. In 1892, of 4,014 ocular diseases, 646 were cases of trachoma, 100 of which had corneal complications. 2d. Trachoma is more frequent among the lower classes, especially among the peasants, who have a very severe form. The upper classes are rarely affected with the severe form, with corneal complications. 3d. The chronic form is the more common. The acute form is observed more frequently in the summer. 4th. Trachoma is certainly contagious; it is propagated most easily in institutions and families where a strict separation of the wash basins and towels is not observed. Furthermore, I have been convinced of this fact from examining the municipal schools of Posen, where I find that the disease spreads in classes, and especially among those who are seated near trachomatous scholars. The proportion between the sexes is about 5% for females and 4% for males.

Dr. S. Miyashita (Tokio, Japan).

1st. Trachoma has existed in this country for at least 1,200 years in the proportion of from 25 to 75% of all the ocular diseases. 2d. This proportion varies according to the patient, being much less frequent in the upper classes and quite common among the poor. 3d. The chronic form is more frequently observed, but acute cases are not rare, especially in the spring and summer. Thus, recently there were 800 simultaneous acute cases in the garrison of this city. Acute cases are much less frequent in winter. 4th. There can be no doubt as to the contagious nature of trachoma, although it is impossible as yet to tell what is the element which propagates it, virus or microbe. It is certain that crowded living is a powerful factor. Since we have isolated the wash basins and towels in the institutions, prisons, and barracks, there has been a marked improvement. According to Sæmisch, very young children are never affected, but this is not the case here.

HYDRAULIC CURETTING OF THE CORNEA

By Dr. **SANTARNECCHI** (Cairo).

Whoever wishes to make a serious and extensive study of the diseases of the cornea can do so nowhere better than in Egypt. Not that this country deserves the reputation which has been attributed to it for centuries, and which is still given to it, of having the undesirable pre-eminence of being peculiarly detrimental to the organ of vision: in general terms, this is far from true, and it may be said that true diseases of the eyes are rarer here than elsewhere. The nature of this article will not permit me to enlarge upon this assertion, but those who have practised here are witnesses of it. However, lesions of the cornea, whatever be the cause, multiple or complex, are quite frequent (I think that I am not far from the truth in saying that they represent 70 per cent. of the ocular diseases), and frequently they are very severe. Among those which compromise the integrity of the visual organ most severely, abscesses and ulcerations of the cornea should be assigned the first place. In such cases the most important question for the physician is the choice, among the various methods of treatment, of that which will be most profitable to his patient. These methods I intend to analyze succinctly before describing the one which I have employed with much success since 1891 (1), making more or less extensive modifications, according to circumstances.

There is no doubt that keratotomy, as proposed by Sæmisch, in the case of rodent ulcers of the cornea, has rendered important service, and that with the aid of antiseptics it will still be of great use; but it is also clear that numerous cases are not suitable for its employment. Keratotomy may be very useful in limited vascular ulcers when the nutritive condition of the cornea is good, but, in my opinion, it is contra-indicated in cases

(1) A letter addressed to Dr. de Wecker and communicated in part by him to *Annales d'Oculistique*, June, 1894.

of large atonic ulcers with the cornea completely or almost completely infiltrated. Is there not, in fact, danger of accelerating complete disorganization of the cornea by a large incision, and, in spite of the most rigorous antiseptis, of favoring migration of micro-organisms into the ocular cavity ?

Keratotomy has also been highly recommended in the treatment of abscesses. It may be employed with advantage if the abscess opens into the anterior chamber, for it then facilitates the evacuation of pus and the cleansing of the walls of the abscess; but I think that it should be discarded if the abscess opens externally, or if it is not completely open.

In the first case, the anterior opening of natural production renders it possible to cleanse the cavity by any method whatever and to wash it out thoroughly, preserving the cornea from the possible consequences of a surgical traumatism, however slight it may be. In the second case, it seems to me more logical to confine intervention to simply opening the anterior wall of the abscess, as I have done in Cases III. and V. In this way the contents of the cavity may be evacuated and the abscess thoroughly cleansed, the advantages will be the same, and, furthermore, the cornea will not have been damaged in its entire thickness, and the final result will be without a cicatrix, or with scarcely a trace of one, as happened in Case III.

And the actual cautery, which in the general enthusiasm supplanted Sæmisch's keratotomy, is not far from undergoing the same fate, and, while keratotomy will always find some indications for its use, the other is destined to be relegated to the domain of history. In fact, if it has been attended with some success in small ulcers which with keratotomy would have been more complete on account of the less apparent traces of injury, its effects are undoubtedly disastrous when the ulceration occupies a large surface of the cornea. In fact, it destroys the healthy tissue with the neighboring infected tissue, and marks the eye with its indelible stigma.

Another method is then necessary which will be less disturbing and less dangerous for the patient, and which, as Dr. de

Wecker says (1), will substitute for an ulcer the walls of which are infected and invaded with micro-organisms, a wound in healthy corneal tissue which an occlusive and aseptic dressing will guarantee against new infection. Such a result may be expected with the greatest confidence from curetting; but Dr. de Wecker himself states that curetting alone is not sufficient, and that it should be followed by energetic irrigation, to remove the portions of infected tissue which the most careful curetting will not carry away. When I commenced my investigations on what I later called *hydraulic curetting* Dr. de Wecker's memoir had not appeared, and I was not aware that ulcerations of the cornea were treated in this way at his clinic. It was in following the same principle which had prompted Dr. de Wecker that I endeavored to find a method for modifying ulcerations of the cornea, at the same time avoiding destruction of the portions of the membrane which had not yet been attacked, and this could only be accomplished by curetting. But whether because it was impossible at that time or in this country to procure the necessary and proper instruments, or that I then thought, as I now do, that there was risk with a cutting instrument of removing portions of healthy tissue with the diseased tissue, and thus falling into the same faults which are attributed to the other methods, I decided to try cleansing the corneal ulcerations by forced irrigations with an antiseptic fluid ($\frac{1}{1000}$ solution of sublimate), and then, instructed by experience, I changed the quality or modified the proportions according to circumstances. At first I employed a large rubber bulb, but the patients could not well bear the strong current. It was only after trying many instruments that I finally decided upon Anel's syringe, employing the large silver point. It gives a fliform jet, but this is energetic enough to detach the portions of dead tissue which cover the fundus of the ulcerations.

The only fault which this instrument has is that it does not contain a sufficient quantity of fluid for complete cleansing, but it is easy to have one constructed of double or triple

(1) Treatment of Ulcers of the Cornea. (*Annales d'Oculistique*, July, 1893.)

capacity, or the irrigation may be repeated as often as is necessary (1).

The method of operating is most simple. After instilling several drops of a 1% solution of cocaine, if the patient is unruly, and separating the lids as far as possible, the ulcers or walls of the ulcerated abscesses are attacked with the jet, applying it over the entire surface, and increasing the violence of the jet progressively until the last portion of adherent ulcerated tissue is removed. When nothing more can be detached, the operation is stopped and a protective bandage applied.

As I have noticed that in the majority of cases the iris is not in its normal condition, I take the precaution to instil a few drops of a solution of atropine in suspicious cases, or when opacity of the cornea prevents exact information regarding its condition.

Under the action of the jet the portions of infected corneal tissue are seen to be detached from the walls of the abscess or the fundus of the ulcer with great facility. Curetting performed in this way has this superiority over that performed with cutting instruments, that it only attacks the diseased tissue and respects the healthy portions, and that, from the fact that it is fluid, it can act on the most obscure folds of the ulcerated cavities.

The immediate reaction following this method of treatment is insignificant. The parts of the cornea which were transparent become gray, but this cloudiness disappears in a few hours. The results are quite as surprising as those described by Dr. de Wecker : suppression of pain and photophobia; clearing up of the portions of the cornea surrounding the ulcers with greater rapidity than with any other method; repair by a tissue which is frequently non-cicatricial, and capable of resuming its transparency so as to leave no trace of the lesion.

In deciding to publish the few lines which follow I did not intend to claim any priority, or to contest its superiority over

(1) I find the syringe preferable to automatic instruments, since it enables the operator to regulate at will the force of the current.

the method recommended by my former and honored master, for, performed by such skilful hands as his, curetting with cutting instruments may easily escape the faults which are attributed to it: but I wished to show that by a most simple method, and consequently one at the disposal of less skilful persons, the same results may be attained. Furthermore, four years' experience has proved the firm grounding of my suppositions, and I hope that if in curetting, and especially in hydraulic curetting, the last word is not said in regard to the treatment of ulcerations and abscesses of the cornea, there will at least be some unquestionable progress.

Case I.—A woman thirty-two years old, with a large abscess on the right cornea, already open externally. The cornea was reduced to a purulent surface, and I rejected the idea of Sæmisch's operation, since perforation was already effected.

Neither did I for an instant consider the cautery, which, even if it could have prevented perforation, and an extensive perforation of the cornea was imminent, would have resulted in a large cicatricial leucoma and the definite loss of the eye, for the small amount of cornea which still remained semi-transparent could not have been utilized later for an artificial pupil.

I thought that if I could succeed in the cleansing of all infectious products from this extensive ulcerated surface, and in stimulating its nutrition, I might preserve a portion capable of being utilized in the future. I then decided upon a method which, as far as I knew, had never been previously employed.

I first, with a large rubber bulb, commenced to pass a current of a solution of sublimate $\frac{1}{1000}$ through the conjunctival sac, after having anæsthetized the eye and its adnexa very slightly with cocaine, so as not to expose them, by exaggerated cocainization, to trophic disturbances, which in the case in question might have been most disastrous. Immediately afterward, with the same fluid, and with a moderately strong jet, I performed copious irrigation of the entire ulcerated surface.

Twenty-four hours after the first irrigation, on removal of the bandage, I was much pleased to find that the secretion was greatly diminished, and that there was far less *débris* of disintegrated tissue on the ulcerated surface of the cornea. The pain still persisted to almost the same extent. A second irrigation, followed by instillation of atropine.

During the irrigation small particles of necrosed tissue were seen to be detached under the action of the jet, and the subjacent layers of the cornea were cleansed, as though by curetting. It was this fact which suggested a name for the new method. These irrigations were repeated every day, to the great benefit of the diseased organ.

In ten days the condition of the lids was normal, and the bulbar conjunctiva was moderately injected with a vascularization which served to nourish the ulcerated surface of the cornea, through which the iris could be sufficiently distinguished to see that it had reacted to atropine. There was no more secretion, and only a few particles of corneal *débris* could be detached by the jet. I thus found myself in the presence of an ulceration of favorable nature and in full course of recovery. From this time the solution of sublimate was changed from $\frac{1}{1000}$ to $\frac{1}{5000}$, and the instillations of atropine were stopped, but the occlusive bandage was continued. Recovery progressed, and finally, of all this imposing spectacle of morbid phenomena there remained only a slight central cloud on the cornea. V = 1. Thus, 25 irrigations, ten of which were with a $\frac{1}{1000}$ solution of sublimate, and fifteen with a $\frac{1}{5000}$ solution, had definitely restored vision to an eye which but a short time before might have been abandoned as lost.

Case II.—A man thirty-two years old, with an abscess covering three-quarters of the surface of the right cornea. In the left eye a deep corneal ulcer. Hydraulic curetting was performed with a weaker solution for the left than for the right eye, on account of the difference in the character of the lesions.

After the first twenty-four hours, improvement commenced, and recovery was satisfactory, especially in the left eye, where there remained only a central cloud which did not interfere with vision.

Case III.—A man twenty-seven years old. A large abscess seated in the lamellæ of the upper external portion of the cornea. It did not open externally.

After opening the summit of the abscess hydraulic curetting was performed. Rapid recovery, with a slight persistent corneal haze.

Case IV.—A man forty-two years of age. Ulcerated abscess and hypopyon of the left eye. Hydraulic curetting, atropine, warm compresses, but no protective bandage, as in the preceding cases.

On the second day the hypopyon began to diminish. Complete recovery was obtained in ten days. A thick leucoma persisted, but an optical iridectomy enabled the patient to use his eye.

Case V.—A woman twenty-nine years old. Interstitial abscess in the left eye and extensive effusion into the anterior chamber.

After emptying the anterior chamber by a paracentesis, the abscess was opened by removing the superficial layers of the cornea and hydraulic curetting performed. After the termination of the infectious symptoms there remained quite a large opacity, which is now diminishing.

Case VI.—A man twenty-eight years old. Multiple punctiform ulcers of the right cornea, probably the result of bullous keratitis.

All former treatment by the most varied topical methods had been of no avail. Hydraulic curetting. The pain, which was considerable before, began to diminish, and the ulcers commenced to clean up and to cicatrize, but very slowly.

At the stage when everything indicated recovery, a renewal of severe pain announced a probable recurrence of the disease. Irrigation was immediately resumed, but the sublimate solution was replaced by a 4% boracic acid solution. Four days later all had returned to the natural order.

In conclusion, it seems to me that this new method of treatment of ulcers of the cornea which I have described should have an important place in the therapeutics of this grave affection.

I have already given my opinion of the value of and the indications for Sæmisch's keratotomy and the actual cautery, which may be serviceable, but are not always applicable. For some time sub-conjunctival injections of mercury have been recommended for these affections, but besides the fact that practitioners are not yet in accord as to its real value, it is not always possible to accept this method, which, it must be said, is undoubtedly very painful in its application. Sometimes one is successful in its use, but after the first or second attempt the patients revolt, and do not wish to hear it mentioned again.

On the other hand, curetting, especially when performed with a fluid jet, is most easily tolerated, and no repugnance on the part of the patient is encountered.

It is indisputable that hydraulic curetting gives the same satisfactory results as grattage performed with cutting instruments, and has this advantage, that the operator is not exposed to removing portions of healthy tissue with the diseased tissue.

Since Dr. de Wecker himself recognizes that curetting should be followed by irrigation, it seems to me more simple to begin where he finishes, still more so as a jet of sufficient force removes all portions of diseased tissue, and, from its fluid nature, will penetrate better than a metallic instrument into the most obscure folds of the abscesses and ulcerations.

And from the cases described above it will also be seen that hydraulic curetting should be followed by a protective bandage, to prevent reinfection of the cleansed surface by new micro-organisms.

The greatest attention should always be given to the condition of the iris, which frequently participates in the disease, and whenever there is a suspicion of iritis, however slight it may seem, recourse should be had to instillations of atropine or scopolamine, and, if it is necessary, to hypodermic injections of cyanide of mercury or of sublimate.

It has also seemed to me advantageous to act on the infection by means of sub-cutaneous injections of cyanide of mercury. Such injections, administered in the thigh or in the back, were given to all my patients.

Cases III. and V. prove that when there is a collection of pus between the lamellæ of the cornea and its opening is inevitable it is preferable to encourage this opening externally by surgical means, to avoid extravasation of pus into the anterior chamber—an accident which should be regarded as most disastrous. For this purpose it is not necessary to perform the classical keratotomy of Sæmisch; it is sufficient to excise, as I did, a small lamella from the anterior wall of the abscess. This opening is large enough to permit of complete evacuation of the contents of the cavity; the hydraulic jet will do the rest.

Finally, all my observations, chosen from among the most varied cases, prove that hydraulic curetting may be applied with advantage to all kinds of corneal lesions, and also that it has the great merit of being recommended by its simplicity, and by the ease of its application.

ON THE POSSIBILITY OF SEEING ONE'S OWN LENS.
PRACTICAL UTILITY OF "PHAKOSCOPY" IN
THE DIAGNOSIS OF FINE LENS OPACITIES AND
IN THE STUDY OF DEVELOPMENT OF CATARACTS

By Dr. **A. DARIER** (Paris).

The study of entoptic phenomena has always attracted the attention of many observers. The picture of the retinal circulation, so carefully studied and described by Purkinje, and which gives such a striking and clear idea of the fine ramifications of the retinal vessels, is well known. Less numerous are those who have seen the capillary circulation in the retina. This phenomenon is indeed so difficult to observe that many authors have doubted the possibility of perceiving the red corpuscles and leucocytes, an entoptic picture which Vierordt was one of the first to describe.

But I myself have clearly observed this curious and interesting phenomenon.

This occurred in London in 1889. One evening while examining at close range, with one eye, a black star-shaped figure on a white ground, I saw after a moment a most curious picture: the black figure had disappeared and on the white surface I saw a strange whirling of numerous and brilliant small bodies moving with great rapidity. At times larger bodies crossed the entire field of observation, following a less uneven course. I immediately had the sensation of seeing before me the same picture which is given under the microscope by the inter-digital membrane or the mesentery of a frog, the picture of the capillary circulation, which had so greatly interested me in my investigations in the physiological laboratory.

When I saw this curious entoptic phenomenon pass before my eye I was immediately seized with a desire to study it with care, but in much less time than I have taken to describe it, it had completely disappeared, at the first effort of accommodation which I made to examine it better, and there remained before my eye only the black star on the white background, standing out with provoking sharpness.

On the next day, while coming out of the King's College Laboratory with Professor David Ferrier, who had just performed before me some interesting experiments on cerebral localizations in the monkey, I spoke to him of the curious phenomenon which I had observed the previous evening. I can still see to-day the expression of pleasure which spread over the face of the eminent physiologist. He was so happy to meet some one who had observed what he also had seen and what so few people had been able to observe. Since that time I have never met any one who has seen the capillary circulation in the retina.

But I do not wish to discuss further the various entoptic phenomena. I wish simply to call attention to the practical utility of the possibility which we have of seeing our own lens with ease, if not in its entirety, at least all of it which may be seen through the orifice of the pupil, whether it is dilated or not.

Two years ago a patient, M. C——, came to me complaining that he saw some dark points in his right eye which greatly disturbed him. On ophthalmoscopic examination I found nothing abnormal either in the fundus of the eye or in the media.

Six months later, M. C—— returned and showed me a drawing of the spots which he saw in his eye, and which he thought were due to alterations in the retina. This sketch, which I reproduce here, did not greatly enlighten me.



I asked by what means these pictures were obtained. It was as follows : In the back of a dark room M. C—— placed a lighted candle. He then examined the flame of the candle through two highly concave glasses placed quite near the eye. I followed his directions, and I saw a small luminous disc presenting almost the same picture which the corneal reflex produces on the retina in examining the fundus of the eye with the erect

image (1). This picture, an explanation of which I had vainly sought for at the beginning of my ophthalmological studies, I later compared to that which I now saw, and I thought that it was the shadow of the lens projected on the retina through the strongly illuminated pupil.

I then made a careful examination of my patient's lens, placing behind the mirror of the ophthalmoscope a lens of 32 dioptries. I was greatly interested to find in his eye small lens opacities the inverted image of which was a reproduction of the drawing which M. C—— had made.

From this observation it was clear to me that under certain conditions it is possible to see entoptically the shadow of the lens projected on the retina. This was for me a new and interesting field of clinical and physiological study, and I was desirous of knowing if I had been the first to discover this important phenomenon.

In the admirable translation of the works of Thomas Young made by my colleague, Dr. Tscherning, I find the diagram, which is certainly a picture of the lens seen by transparency.



The brilliant border of the pupil is very well reproduced, and this author says: "The radial lines (which are seen in the

(1) This corneal reflex is, in fact, the same as is obtained from the surface of a metallic sphere. It appears as a very small, but as a very brilliant, luminous point. If it is held very near the eye the rays which emanate from it are so divergent that after traversing the refractive media of the eye they remain parallel, and project a shadow of the lens on the retina.

When I saw this picture of the corneal reflex for the first time I perceived that it was an anatomical figure, and endeavored to find what the elements were which formed it, and which I had never seen elsewhere. It was not until sixteen years later that chance led me to recognize the nature of this picture.

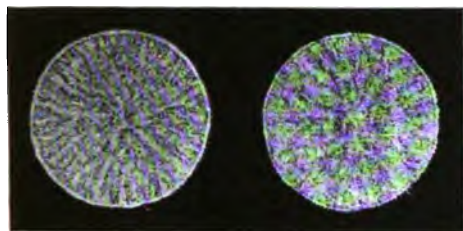


Fig. 3.
Cristallin
de mon œil droit

Fig. 4.
Cristallin
de mon œil gauche



Fig. 5.
Trouble de la cornée
produit par
occlusion prolongée de l'œil.

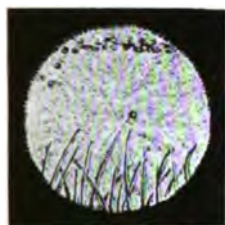


Fig. 6 et 8.
Projection des cils de la paupière supérieure,
mucosités et larmes sur la cornée



Fig. 8.

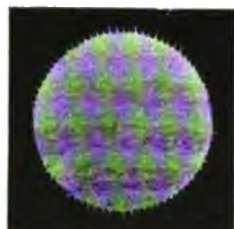


Fig. 7.
Plissement de la cornée
par pression digitale sur la paupière.

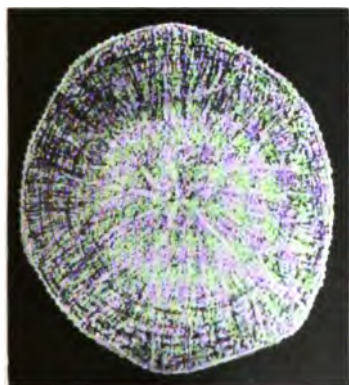


Fig. 9.
Cristallin de mon œil droit après mydriase,
Pupille irrégulièrement dilatée.

La périphérie du cristallin est plus ombrée que le centre.

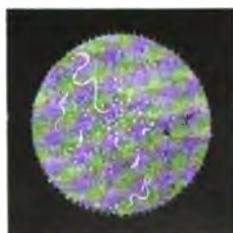


Fig. 10.
Corps flottants physiologiques
du corps vitré.

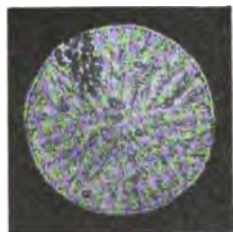


Fig. 11.
Larmes et mucosités sur la cornée.

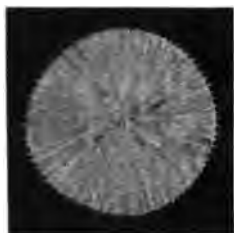


Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.



Fig. 16.



Fig. 17.

Fig. 12, 13, 14, 15, 16, 17, cristallins normaux dessinés par différents confrères de 25 à 40 ans.

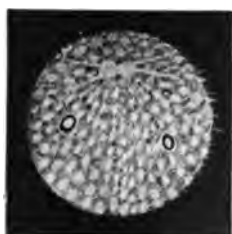


Fig. 18.

Cristallin d'un artiste peintre atteint de kératocone à sommet inférieur deux grosses larmes sur la cornée.



Fig. 19.

Cristallin avec décentration de la cornée.



Fig. 20.

Cataractes sémiles commençantes.



Fig. 21.



Fig. 22.

Cataracte ponctuée.

accompanying diagram) are probably occasioned by small irregularities in the surface of the lens."

This is all that I have been able to find in this author's work.

In Helmholtz's *Physiological Optics* is found quite a complete history of the different entoptic phenomena.

The muscæ volitantes have long attracted the attention of many observers, but one only, Listing, has given special attention to the entoptic appearances supplied by the lens.

He describes four principal forms:

(a) Pearl spots resembling at times air bubbles, and at times drops of air.

(b) Obscure spots of many and various forms.

(c) Clear bands appearing most frequently as an irregular star.

(d) Obscure radial lines which are certainly dependent upon the radial structure of the lens.

I have found nowhere observations concerning the cataractous lens. However, I do not think it possible that the utility of *autophakoscopy* in the study of diseases of the lens has escaped attentive observers. If it is not mentioned, it is probably on account of the difficulty which existed formerly in making these observations and in causing the patient to make them.

According to Thomas Young, on examining a very small luminous point quite near the eye (the flame of a candle seen through a lens or by reflection from the surface of a larger lens), an almost circular surface is seen uniformly illuminated and having very fine lines with a radial direction. These lines, he says, are probably occasioned by small irregularities in the surface of the lens. When pressure is made on the eye by keeping it closed for a moment, vision frequently remains confused for a short time after the finger is removed. He gives two illustrations of these appearances which are the most exact that I have found.

Young, with the genial acuity of his observing mind, traced in Fig. 2 the brilliant double contour produced by the border of the iris. He was looking for something else, and therefore made no mention of this shadow of the lens.

According to Helmholtz, to perceive entoptic images it is necessary to cause light to penetrate the eye, coming from a very small luminous point situated quite near this organ. The most convenient arrangement, he says, consists in using a convergent lens of large opening and small focal distance. In the focus of this lens he places a screen pierced with an opening through which the eye looks.

All these arrangements are, in my opinion, too complicated, and less practical than that which Dr. Chappelier found empirically.

What is, in fact, required to project a distinct shadow of the lens on the retina?

It is necessary to have a luminous source sufficiently small, sufficiently intense, and especially sufficiently near the eye, that the rays which emanate from it, after being refracted by the dioptric system of the eye, will come out parallel, to form on the retina a shadow of the objects traversed by these rays. If these luminous rays still preserve a slight divergence, the shadows of the objects will be enlarged. If, on the other hand, they are somewhat convergent, the image will be reduced.

If, then, a candle placed at about 5 metres away is taken as the source of light, and if a bi-concave lens of 30 to 40 dioptries is held before the eye, a divergence will be given to the parallel rays emanating from the candle, so that they will still remain divergent after having traversed the lens.

M. Arnhold, an optician, has constructed a very simple instrument on the above principle (phakoscope). By means of this instrument one may with daylight see all the entoptic phenomena, which I shall describe, with great facility. It is thus easy to draw them very exactly.

By this method, far more simple than those described by Helmholtz and Young, I have made the following observations:

Through concave lenses held at 1 centimetre from the eye, instead of the flame of the candle a brilliant circle is seen, luminous and golden yellow (when daylight is used for illumina-

tion this circle is white, and this is the case with M. Arnhold's phakoscope; when electric light is employed, the disc is of a bluish color).

The diameters of this luminous disc are in relation to those of the pupillary orifice, and they increase or diminish as the pupil, influenced by accommodation or light, is dilated or contracted. It is also easy to see the dentated border of the iridian muscle appearing black on the brilliant fundus in brunettes, but more diffuse and irregular in blondes. It is represented in most of the accompanying illustrations.

The luminous disc is not always a perfect circle. Its form is absolutely dependent on the form of the pupil, which may be oval or irregular from synechiæ or former operations. The form may also be slightly oval when the concave lens is held obliquely, as the latter then acts as a *sphero-cylindrical* lens.

Let us now consider the peculiarities presented by this luminous zone. At first nothing is clearly distinguished, and one is embarrassed by the multiplicity of details. Later, little by little, the retina becomes accustomed to this new spectacle, and soon an analysis is easily made. The luminous surface is not homogeneous, but granular, with radial striæ and a uniform fundus, always the same (lens and lens capsule), on which are projected various dark shadows (ciliæ and mucus) and some sparkling points (tears, cells in the vitreous humor, etc.).

I give, however, a series of illustrations which will be far better understood than long descriptions (see the two plates):

Figs. 3 and 4 show the structure of my own crystalline lenses: OD—OS. They have almost the same radial striation, but have an individuality which enables one to be easily distinguished from the other. Few people have lenses like mine. I give further on drawings of lenses which friends have made. Fig. 5 shows the disturbance produced on the cornea of my left eye after prolonged digital pressure, during which I was studying the projection of the ciliæ of the upper lid of the other eye (Fig. 6). The ciliæ seemed, at first, to be those of the lower lid, but it is easy to account for this illusion; it is sufficient to press the lens against the lid. The image is inverted because the rays which traverse the upper portion of the

lens form a shadow on the upper portion of the retina, which is accustomed to receive external impressions from below.

We thus have a new proof, if such is necessary, of the identity of the eye with the camera obscura.

Digital pressure may also produce folding of the cornea, which can be seen in Fig. 7.

Fig. 8 shows tears and mucus on the cornea, which appear with sharper outlines and more brilliant luminous reflexes than are given by bodies within the eyeball. The ciliæ also are very distinctly marked, and frequently have a double or triple luminous contour.

Fig. 9 shows the lens of my right eye after as complete mydriasis as possible, with duboysine. The pupil is not perfectly round, and the dentated border of the iris and its double contour are more diffuse. The centre of the lens is clearer and more sharply marked, while the periphery is somewhat indistinct.

Fig. 10 shows the physiological floating bodies in the vitreous humor, which are far more abundant than is usually supposed.

Fig. 11 also shows tears and mucus attached to the cornea; a movement of the lids displaces them and causes them to disappear. These various accessory phenomena frequently interfere with the first observations, but one soon becomes accustomed to disregard them. It is easy to become convinced of this by asking any intelligent man to make a drawing of what he sees by the process I have described, and especially by means of the phakoscope.

I give also a number of drawings of lenses made by colleagues or patients. All have this radial striation more or less regular, rectilinear or undulated.

It would be easy to reproduce many of them, but they are all similar. The next two illustrations show a slightly irregular de-centration; Fig. 19 very slight, Fig. 18 considerable.

The latter was made by an artist with keratoconus. The point of the cone caused the deviation upward of the centre of the figure. A brilliant corneal reflex shows the summit of the keratoconus. Two large spots with double contour represent tears. The artist's fancy reproduced the radial striation of the lens in a series of luminous points which are very interesting.

The aspect of these two figures leads to the supposition that it would be possible by phakoscopy to study certain anomalies of curvature of the cornea.

The following illustrations are the principal types of lens opacities.

It is needless to say that drawings of this kind can only be obtained from intelligent patients, and, indeed, from patients with a lens sufficiently transparent, so that the opaque portions will appear black on the luminous fundus.

In such cases examination of the lens should always be made after dilatation of the pupil, and the diagram made by such patients should be controlled by examination with an ophthalmoscope supplied with a strong convex lens. It should not be forgotten that what the patient sees is the inverted image of what we see with the ophthalmoscope with the erect image. I have given the reason above.

Figure 20 is the type of the ordinary senile cataract in its commencement.

Figure 21 represents a transverse opacity of the lens.

Figure 22 is one of those rare forms of punctate cataract which still permits of perfect central vision.

These investigations, or rather observations, may be varied in an infinite number of ways. Possibly they are not of great diagnostic importance, but they may be useful in studying the development of cataract.

By means of this simple and ingenious method a clever observer can easily follow the development of a cataract in his own lens, if he has the misfortune to be thus affected. He can observe with exactness the influence of various forms of treatment on the progressive or regressive development of lens opacity. Possibly, by means of entoptic observations, we may succeed in making such an early diagnosis of disturbances of nutrition in the lens that means of preventing them may be found.

That these observations may be useful, it is generally necessary to dilate the pupil slightly with cocaine, especially in aged persons whose pupils are very small. Cocaine has the inconvenience of making the cornea insensible and clouding it if it is left too long in contact with the air. If, then, this agent is used for dilating the pupil, it will be well to keep the lids closed until dilatation occurs.

INTERSTITIAL KERATITIS IN ACQUIRED SYPHILIS

By Dr. A. TROUSSEAU.

Interstitial keratitis from acquired syphilis, long passed over without mention by classical writers, has begun to find its place in the more recent treatises on ophthalmology (for example, in that of Galezowski and Daguene, and that of Panas), although there has not yet been assigned to it characteristics very clearly defined and special, by which it may be differentiated from the keratitis of hereditary syphilis. Many of those who have denied the direct relation of parenchymatous keratitis with hereditary keratitis are, however, constrained to admit, in the face of the evidence of accumulated facts, the influence of acquired syphilis upon the cornea. A weighty argument against the origin of keratitis from hereditary syphilis is found in the assertion of the integrity of the cornea in syphilis by direct infection. With many other such arguments this has survived, although no one longer claims that the transparent membrane is protected from the ravages caused by the virus in the contaminated organism.

Is the rarity of interstitial keratitis in acquired syphilis as real as has been claimed, or have observers, imbued with adverse views, searched with sufficient care for syphilis, when examining an adult affected with interstitial keratitis? The discovery of the taint of syphilis, hereditary or direct, does not impose itself upon us; it is frequently only reached as the result of patient research and an abundant preliminary training. Evidently it is easier, and it is certainly less scientific, to pronounce a person gouty, rheumatic, or cachectic than it is to pursue, step by step, a difficult inquiry in which the physician has usually little aid from the patient or his family, who are more interested to cover than to open the path through which recovery must come.

Professor Panas, in his treatise on ophthalmology, cites 37 cases of keratitis due to acquired syphilis. If, on the one

hand, he forgets those of Galezowski, of Parinaud, and my own (*Union médicale*, December 13, 1888), as he does not mention them, on the other hand it must be admitted that among the cases published many are open to objection, either because the syphilis has not been clearly proved, or because authors have classed descemetitis and serous iritis among cases of interstitial keratitis. We may consider as nearly exact the number 37 as cases published, but how many have occurred which have not been recognized or not been published? For my own part, since I have become interested in this subject, I have collected ten authentic cases, although I have not given all the attention necessary in this respect to the cases which have come under my observation. At the session of February 9, 1895, of the Medical Society of Paris, Dr. Millée read a well-defined case, which is so analogous to my own and to those of others, that I think it wise to offer this discussion upon interstitial keratitis from acquired syphilis.

This keratitis appears more frequently among women than among men, since in the 11 cases which I have followed, including that of Dr. Millée, 8 were women and 3 were men. Here we find a parallel to the hereditary syphilitic keratitis, which is more frequent among girls than boys.

If hereditary keratitis often affects both eyes simultaneously or consecutively, acquired keratitis has, in my observations, been almost always unilateral (nine times out of eleven), which confirms Haltenhoff's observations (French Ophthalmological Society, 1887), who found it unilateral in four out of five cases.

Relapses, which are somewhat usual in the hereditary form, have seemed to me less frequent in the cases from direct infection; I have seen but one relapse in the 11 cases. At the same time it is not certain that patients may have had relapses and may not have returned to me, and I only call attention to the fact without attaching much importance to it.

Nearly always the corneal troubles have their commencement between the end of the first year after the infection and the commencement of the third year, frequently accom-

panied by divers clearly defined syphilitic indications. A fact worthy of recording from the point of view of localization, is that two of my patients had other specific ocular symptoms (conjunctivo-palpebral syphilomata). I have not found that any of the patients were especially debilitated—at least, applying this term to those individuals who did not live in the best hygienic conditions. Three women enjoyed, before the infection, robust health. Rheumatism or gout, more or less of primitive diathesis, have occurred twice in the eleven cases. We cannot avoid the reflection that if the cachexiæ, gout, and rheumatism play scarcely any rôle in the development of interstitial keratitis of adults, there is scarcely a reason why they should be so influential in the genesis of the keratitis of children and youth. I may be criticised for basing this consideration upon a grouping of cases of evident syphilis, and the criticism would have a measure of justice if I could not cite incontestable statistics, and if I could not add that during the last two years I have not seen a *true* case of interstitial keratitis which was not of syphilitic origin. Cases which came under my observation before this period were not investigated by me with sufficient care to enable me to say whether causes other than syphilis are capable of engendering *true* interstitial keratitis, excluding from this qualification cases of serous iritis, etc.

The commencement of acquired keratitis is insidious, the cornea becomes opaque slowly, and the reactional phenomena are only moderate during the period of activity. I have never seen that painful photophobia, that intense lachrymation, that active injection which is often encountered in hereditary keratitis. The cornea does not become vascularized, or only to a moderate extent, and a return to transparency is quickly effected. The duration of acquired keratitis is less than of hereditary, the various stages of the disease are shortened, and the *restitutio ad integrum* is decidedly more easy and more frequently realized than in hereditary syphilis. The iris is always attacked somewhat violently, and the vitreous body

becomes filled with the well-known cloud; choroiditis often coexists.

The last phenomenon which persists after the return of transparency to the cornea is hyalitis.

Mercurial treatment acts marvellously upon the corneal lesion, the regression of which, under its influence, may be followed almost from day to day. It is known that in hereditary syphilitic keratitis general treatment acts less quickly. Still, if instituted at the very start, it has always seemed to me more efficacious. What is the outcome of syphilitic keratitis without mercury? Does it continue longer, and does it leave after it important sequelæ? I trust that it will not come to the thought of any physician worthy of the name to make this unjustifiable experiment. The cure of all the forms of keratitis which I have followed has been realized in a period of time varying from five weeks to three months: it is a period shorter than is usual in favorable hereditary cases.

To what is this difference in the duration and progress of the two varieties of keratitis due? Does it depend on the direct or indirect effect of the infecting virus, or on the age of the subjects? I should be forced to admit this latter reason if I based my opinion upon a single case, that of a child of eight years, who, infected by its nurse, becomes syphilitic by acquisition, and has under my observation double interstitial keratitis, very severe and tedious, assuming the worst characteristics of hereditary keratitis. It would be necessary, in order to give the proper value to this case and to the theory which it seems to confirm, to be able to affirm, on the other hand, a greater benignity of hereditary syphilitic keratitis occurring in the adult, which does not seem evident to me. There is in that direction a subject for study worthy of our attention. If observations agree, there could be attributed to the more feeble resistance of the young subject, or to that of its corneal membrane so predisposed to phlegmasias, the severity of hereditary keratitis, as well as the corneal alterations, which are greater in hereditary syphilitics than in those of acquired syphilis.

Is not the result of treatment also varied according to the different ages and to the different modes of infection ?

CLINICAL NOTES.

CYSTIC ANGIOMA OF THE ORBIT ; ELECTROLYSIS.

By Dr. E. VALUDE.

Angiomas of the orbit, and in particular cavernous or cystic angiomas, are affections which, without being exceptional, are still somewhat rare. They are, nevertheless, well known, and have been very thoroughly studied. Without mentioning all the articles, theses, and cases which have been published in this connection, let me simply recall a memoir by Dr. Panas (*Archives d'ophtalmologie*, 1883, Vol. III., p. 1) in which the subject is very fully treated, and a recent article by H. Becker, in *Gräfe's Archives*, Vol. XLI., No. 1, containing a review of all former articles on this question.

All authors agree that tumors of this class have a predilection for the muscular funnel of the orbit—that is to say, the portion of this cavity which is most inaccessible for surgical interference while the eyeball is still in place. A puncture or a simple incision of greater or less extent might be performed without injury to the eyeball, but it would scarcely be possible to successfully manage the operation for extirpation of a tumor, and especially of an angioma, the proper characteristic of which is to be intra-muscular, without causing extensive damage to the muscular and nervous apparatus of the orbit, and indeed, without at the same time removing the eyeball. -

The latter almost always occurred in cases where total ablation of the tumor was performed, and in such cases enucleation of the eye was generally legitimate, since the organ was already useless for vision.

On the contrary, in the case which I shall describe, the eye, although markedly projecting, had preserved fairly good vision, and it was this circumstance which, in the various tentative operative methods which I employed, caused me to reject the idea of total extirpation. In order to leave in place an eye endowed with sufficient vision, I decided in this case to employ electrolysis, for up to the present time extirpation has been the method recommended by authors. To my knowledge, only one case of cystic angioma of the orbit treated by electrolysis has been published ; that was a case of Thompson's, and was a complete success (*Archives of Ophthalmology*, Vol. XII., p. 183, or *Archiv für Augenheilkunde*, XIV., 22, p. 170, Schöneman's translation).

The following is a description of my case, which adds another good result from the use of electrolysis :

Case.—Mlle. M——, ten years old, came to the Quinze-Vingts for consultation on October 13, 1890, with a slight exophthalmus of the left eye.

There was the history of a traumatism three years before ; at that time the child's head had come violently in contact with a door, with the result of an immediate ecchymosis of both lids and of the cellular tissue of the orbit and protrusion of the eyeball. There was, however, at that time, no sign of a fracture of the skull ; no loss of consciousness, or external flow of blood.

Beside this, there was no morbid stigma, no cardiac affection or hereditary disease.

When I saw the patient for the first time, objective examination of the left eye showed that the veins were slightly swollen. V $\frac{1}{4}$. The child, it is true, was hypermetropic, and in the other eye V $\frac{1}{4}$ without glasses.

At the time of the first examination, the exophthalmus was but slight ; no tumor was perceived on digital exploration, and auscultation revealed no abnormal bruit.

I lost sight of the patient for several years, but on April 11, 1894, nearly four years later, she returned with an enormous exophthalmus, so great that closing of the lids had become impossible. Digital exploration revealed a resistant swelling in the upper palpebral

furrow, but the sensation of a tumor was very vague. There was no souffle, and the tumor did not diminish on pressure. Vision continued good, and was almost the same in both eyes. The papillæ were the same.

An exploratory puncture was made with no result. Persuaded, however, of the existence of a cystic cavity, I performed, under chloroform, an exploratory incision in the upper palpebral furrow. A long and narrow bistouri was introduced quite deeply along the orbital vault, and at a given time about 8 grammes of a thick, dark-brown, hematic fluid escaped. The eye immediately returned to its proper place and the exophthalmus disappeared.

Sutures ; antiseptic dressing.

Fifteen days after this puncture the wound was perfectly cicatrized, but I found that the eye was gradually returning to its former condition of protrusion.

I made another incision in the lid at the same point, but larger, and succeeded in dissecting to the cystic pocket, which had been emptied at the time of the first intervention. Exploration with a well-disinfected finger enabled me to recognize perfectly that this first pocket was empty, and underneath it I felt a resistant arch with the index finger which indicated the presence of a second sub-jacent cystic pouch. This was incised, employing my finger as guide, and immediately the same bloody fluid made its appearance. The eye was again reduced, but the exophthalmus reappeared in a few days.

I now endeavored to attack the cystic pocket from below, and an incision was made in the lower palpebral furrow. A more decidedly bloody fluid was evacuated than at the former interventions. The eye, as before, returned to its place immediately after the operation.

The results of this third puncture were quite as simple as in the preceding operations, but the exophthalmus reappeared in the same manner, and quite rapidly.

The patient, discouraged, decided to return home, and left the hospital on December 15, 1894, with an exophthalmus as great, if not greater, than that which she had had at the time of entrance, and somewhat diminished vision : OS, V = $\frac{1}{4}$; OD, V = $\frac{1}{4}$. The left disc was slightly cloudy, and the veins flexuous. There was no atrophy.

On April 29, 1895, the patient returned and put herself under my care. The conditions were the same as on her departure from the hospital in December, 1894.

At this time I considered the possibility of radical intervention and extirpation of the tumor; but, in addition to my repugnance to sacrificing an eye still retaining passable vision, there was also the question of the difficulty of the operation. In the exploration which I had made at the second puncture I had discovered the fact that the envelopes of the tumor were intimately connected with the walls of the orbit and the parts covering the fundus of the orbital funnel. Furthermore, considering the fact that this was a vascular tumor, extirpation promised to be laborious.

I resolved, then, to try still another method before going to this extremity, and thought of uniting methodic compression with sub-cutaneous injections of ergotine. After aspiration with Potain's apparatus, which yielded about 15 grammes of almost pure blood, I was able to return the eye to its place, and energetic compression was applied. On the following days a succession of sub-cutaneous injections of ergotine were given, but with no avail. After fifteen days the exophthalmus was as large as before.

I then tried electrolysis. A long steel needle was introduced in the lower orbito-palpebral furrow at the point where the finger could most distinctly feel the presence of a deep tumor, and this was plunged to the fundus of the orbital cavity. This needle constituted the *negative* pole, the positive pole being applied near by on the cheek. A current of $4\frac{1}{2}$ milliampères for five minutes.

After a few days I was greatly surprised at the result obtained. This cystic tumor, which had increased for seven years, and which had resisted several punctures, was already three-quarters reduced.

A second application of electrolysis was made eight days later under the same conditions as the first. It led to a complete disappearance of the exophthalmus, and of what could be felt of the tumor with the finger. In less than fifteen days a complete recovery was thus obtained.

The patient was kept under surveillance for several weeks, and left after I was assured that the disappearance of the exophthalmus was definite. There was no longer a trace of protrusion of the eye, which had resumed its normal position. There remained only a slight limitation of the movements of the superior rectus muscle, and a little sinking in of the upper orbito-palpebral furrow marking the trace of my former operations. There was no ptosis. Vision has resumed its former acuity; $V = \frac{1}{2}$.

Any comments seem useless after such a rapid success. Thompson, in his case, had had a result quite as prompt and brilliant. His patient was also young, a child five years of age. He only made one application of electrolysis, and introduced the *positive* pole into the tumor.

Perhaps in my case a single application would have been sufficient, for after eight days improvement was such that if nothing more had been done it is probable that retraction would have continued until it was complete. But whether there was one or two applications of electrolysis, the result was none the less prompt.

This is, then, a great success due to the method of treatment employed, especially if one considers that in cases of angioma of the fundus of the orbit, outside of electrolysis, there remains only extirpation, with its grave consequences, from the point of view of the eyeball and the integrity of the muscular parts contained in the orbit.

In the case which I have described, as I could not persuade myself to enucleate an eye with such good vision, I had even thought of making a way through the external side of the orbital cavity by removing the temporal border of this cavity and replacing it by sutures. I would thus have been able to completely extirpate the tumor from the fundus of the orbit, but at the price of what injuries and what dangers! And, not to speak of the inevitable muscular paralysis, would not the eye have been exposed to all kinds of accidents, from the most serious trophic disturbances to optic atrophy?

In striking contrast to interventions of such gravity and the inconvenience of an empty orbit, in which it is difficult to place an artificial eye, should be considered the simplicity of electrolysis, which gives a result so perfect and so rapid that no other method of treatment can be compared to it. It leaves no visible trace, and produces only insignificant pain.

RARE COMPLICATION AFTER EXTRACTION OF THE CRYSTALLINE LENS

By Dr. de SPÉVILLE.

Among those complications which may arise after an operation for cataract, excluding those arising from infection, there is one of which mention is scarcely made in the text books, but which deserves attention. It is the prolonged flattening of the anterior chamber after the extraction of the lens, and this not during a week or two, but during months.

Three cases, two of which are my own, and one of which has been very kindly communicated to me by my colleague, Dr. Trousseau, furnish the material for this paper.

The first is that of a woman eighty-three years of age, who first consulted me May 30, 1893. The cataract, complete in the left eye with good perception of light, had scarcely commenced in the right eye. This woman had never been ill, and presented an instance of robust old age. I did not operate on the left eye until the 3d of April, 1894. I did the extraction without iridectomy, after having made a sub-conjunctival injection of eserine. The nucleus was surrounded by masses of half-hardened cortical substance, which were expelled with the greatest care. No accident happened during the operation. The second day, on raising the bandage, I recognized an extensive prolapse of the iris, which was at once excised. The pupil was as black as possible, but the anterior chamber had not been re-established. Six or seven days after the operation the patient was able to see the time by a watch with a glass of + 15 D. In about two weeks the centre and the upper part of the cornea became the seat of a slight trouble, which increased during the following days, and at length became milky white. Vision was considerably diminished.

At the end of a month, notwithstanding the uninterrupted application of the compressive bandage, the anterior chamber remained flattened, the cicatrization of the wound being in the meantime complete. Healing having taken place, I discontinued all treatment.

On the 12th of June, 1894, I operated on the second eye (the right), the cataract of which was then complete. This time I did

iridectomy, and avoided prolapse of the iris. On the fifth day the patient could see the time by the watch with a glass of $+ 15$ D. Nevertheless, the same phenomenon was present—that is to say, the anterior chamber was not re-established in this eye any more than it was in the other, notwithstanding the continued application during six weeks of the compressive bandage.

The central and superior parts of the cornea of the right eye became also, in about a fortnight, the seat of a trouble, at first slight, and at length it became milky white. The condition of the patient did not change until November, 1894. On the 3d of November I observed a hypertension of the right eye (the last one operated on) with a change of color of the iris (a rusty color); at the same time there occurred somewhat violent ciliary pains. In fact, there were all the symptoms of a glaucomatous process. In view of the complete absence of the anterior chamber, I did, instead of a sclerotomy, a scleral puncture above, at about one centimetre behind the ciliary region.

The patient had a respite of some days, then the glaucomatous process came on again. I determined to make an iridectomy, notwithstanding the absence of the anterior chamber. The next day, on removing the bandage, I was greatly surprised to see that the anterior chamber was reformed. The glaucomatous phenomena had disappeared.

Eight days later I did an iridectomy below, upon the left eye (which had always preserved a normal tension), with a like success. At the present time the patient no longer complains of the right eye, and sees sufficiently well with the left to enable her to go about.

The second case is that of a woman of seventy-six years, with complete cataract of the left eye and commencing cataract of the right. In excellent general health; no previous disease. I operated on the left eye October 29, 1893, without iridectomy. The crystalline had the appearance of a gummy mass with very little cortical substance. No accident during the operation. Two days later, the appearance of the eye was excellent; the pupil round and very black, but with complete absence of the anterior chamber. Eight days later the wound appeared completely united; the patient said that she saw very well (with $+ 15$ D she saw the time by the watch), but the anterior chamber was not re-established. About the fifteenth day, at the centre of the cornea, in extent about equal to the pupil, a slight cloud was perceived, which increased during the following days, and

presently assumed the same milky appearance observed in the first patient. The compressive bandage was applied for a month without interruption, but the flattening of the anterior chamber persisted. December 31, 1894, I did an iridectomy below. On the following day the anterior chamber was re-established as deep as in the normal condition.

The third case, which has been communicated to me by my colleague, Dr. Trouseau, is also an interesting one. He reports the case as follows :

“ A man seventy-four years of age, for many years emphysematous, with Bright’s disease, showing during the last fifteen months a large amount of albumen in the urine, was operated on for ordinary senile cataract, under the usual conditions.

“ The operation was performed in an arm-chair which the patient scarcely quitted until his recovery, on account of his repeated attacks of suffocation. The operation would not have been attempted under such conditions, except under the peculiar circumstances of the patient, who was unusually affected by his blindness, and who had been previously informed of all the risks in the case. The patient was very unmanageable during the operation, and notwithstanding my desire, I did not dare to do an iridectomy. In spite of all, on the fourth day, when the bandage was removed, the eye was not irritated and there was no hernia of the iris ; but the wound, although in coaptation, was not united, and the anterior chamber was not re-established. On the fifteenth day, matters were in the same state, and, the iris still showing no tendency to rebellion, the bandage was removed in accordance with the wish of the patient, who declared himself satisfied with the result, although seeing very little. He would, he said, take the chances of his sight. Thirty days later, the wound was united, except a small portion of the middle part, which at each effort of coughing (often repeated) permitted an escape of the aqueous humor. I did not think it necessary to interfere further, and permitted the patient to take short walks, by which his general condition was improved. I frequently saw the patient during the next two months, and I did not recognize either redness or irritation of the eye, although the conditions had not changed. Three months after the operation, the patient left for the country and did not return until six months after the operation, the conditions continuing unchanged. I proposed an iridectomy, which he refused, saying that he was content with what he had. The patient then asked me to operate on his other eye, which I refused to do, since which time I have not seen him.”

Judging from the silence of authors and the complete absence of observations concerning this post-operative complication of cataract, it is to be presumed that it is very rare. It is this which has influenced me to submit to your consideration the cases which have come under my observation.

What could have been, in these patients, the cause of this prolonged absence of the anterior chamber after extraction of cataract? I do not think that it should be attributed to the manner in which the corneal flap was made. The lips of the wound made in the transparent cornea did not overlap, and on the contrary adapted themselves perfectly, as in the end their perfect union demonstrated.

Nor should the general condition of the patients be held responsible, at least so far as concerns my two cases, who, notwithstanding their somewhat advanced age, both enjoyed excellent health. The same cannot be said, however, of Dr. Trousseau's patient, who was emphysematous and albuminuric, and in whom the wound, although in coaptation, was very long in uniting. We see, indeed, that in this last case the wound was united after about thirty days, except a small portion in the centre, which, with each effort at coughing (often repeated), permitted the escape of the aqueous humor. Under such conditions, it is not surprising that the anterior chamber was not re-established. The cause here is easy to find.

In my two patients, no such conditions are found. In the first, the left eye, first operated on, was the seat of an extensive prolapse of the iris, which was excised the third day, immediately after the removal of the bandage. This accident, which unfortunately is still somewhat frequent, has never, so far as I know, produced such a complication. Furthermore, in this same patient, the right eye, operated on two months later with iridectomy, presented the same anomaly on the part of the anterior chamber, notwithstanding that nothing unfavorable had happened to the iris.

In the second case, the operation, done under absolutely normal conditions, was followed by no unfavorable occurrence. On the third day, the eye did not present the least inflamma-

tory reaction. The pupil was round and black ; the wound, in good state of coaptation, apparently united. In short, the result of the operation promised to be perfect, notwithstanding the complete absence of the anterior chamber, which did not alarm me, knowing that the anterior chamber is sometimes slow in being re-established. On the eighth day no change had occurred, and yet vision was good, as the patient was able to see the time by the watch with a proper glass.

Compressive bandages were continued during a full month, in these two patients, but with scant success, and since matters remained as they were, the bandages were at the end of this time entirely dispensed with. Then, as the wound was absolutely united in its entire extent and there was no longer reason for continuing the bandages, we see nothing in either of these two patients which, so far as we know, should furnish a plausible and conclusive explanation of this total and prolonged absence of the anterior chamber after extraction.

Can it be a question of idiosyncrasy, or should we expect to find the cause in an arrest of the secretion of the aqueous humor, induced by the shock of the operation, under some nervous influence? And does not the prompt re-establishment of the anterior chamber after an iridectomy suggest this hypothesis?

Then, if this complication occurs after cataract operation, how should it be met?

The most rational method—that, indeed, which has been generally advised—is the prolonged application of the compressive bandage, for it may be that there is simply a delay in the re-establishment of the anterior chamber for a few days ; but if, at the end of three weeks, there has been no change in the condition of the eye, and if the wound has healed, the bandage can without disadvantage be removed, and then it is that one should know whether it is best to interfere or to wait.

The expectant method would, without doubt, be preferable, if this prolonged absence of the anterior chamber did not expose the eye to important dangers. There is, in fact, danger not only of disorders which may compromise vision, but which may occasion the complete loss of the organ itself.

In the two cases, there was to be seen, after about two weeks,

a disturbance of the cornea, at first slight, but which increased from day to day, and at length rendered the cornea milky white. Oblique illumination showed that the trouble was deeply seated, the external layers of the cornea having maintained their smoothness and their transparency. Moreover, this disturbance in the first patient corresponded exactly to the pupillary opening, and to that produced by the iridectomy, and, in the second case, corresponded to the pupillary opening alone, iridectomy not having been done. All the rest of the cornea maintained perfectly its transparency.

This corneal trouble seems to have been brought about by the intimate and prolonged contact of the posterior face of the cornea with the vitreous, separated only by the posterior capsule, for all that portion of the posterior surface in contact with the iris remains unaffected.

This affection of the cornea recalls that described by Nuel at our Congress of 1892. It resembles that by its uniform milky appearance and its non-inflammatory nature. But it differs in respect to its location and the cause which produces it. In fact, the affection described by Nuel is evidently parenchymatous, and occupies the entire cornea; it is produced, according to our colleague, "by the penetration of foreign fluids into the anterior chamber, either immediately after the operation or during the first or second application of the bandage, if that is done before the corneal wound is closed."

The affection which I have described appears, on the contrary, to have its seat entirely in the deeper layers of the cornea, possibly only in the posterior epithelium and in the membrane of Descemet; it is exactly circumscribed to the portion of the posterior surface of the cornea, in intimate contact with the posterior capsule and vitreous. It is, then, to be presumed that the trouble is here produced by the contact of the two surfaces, and not by penetration of a foreign fluid into the anterior chamber.

Finally, in the first case, the right eye was the seat of somewhat active glaucomatous phenomena which I endeavored to combat by a scleral puncture, without much success. I then decided to do an iridectomy below. I made the corneal sec-

tion with a lance-knife, and the iris, naturally, was traversed from side to side at about 2 millimetres from its external border; then I excised the two portions of the iris and applied the bandage.

The next day, on removing the bandage, what was my surprise to see a deep anterior chamber re-established—in a word, a normal condition. Some days after, I repeated the operation on the other eye, and I did the same operation for the other patient, with equal success.

I have much regretted that I did not take this course sooner, for I am convinced that I would have avoided the disorders (corneal trouble and glaucomatous pressure) of which I have spoken.

The conclusion which I draw from what precedes is that if, after an operation for cataract, the anterior chamber is not re-established in from three weeks to a month, and if there is a slight corneal disturbance even before this time, there should be no hesitation in performing an iridectomy. This operation will immediately re-establish the anterior chamber, and if made in season will avert the glaucomatous process and the corneal trouble.

Editorial Note.—I take the liberty of adding a few words to Dr. Oger de Spéville's article.

I have had occasion to observe a number of cases in which the anterior chamber has required a long time for re-establishment, and I have published these cases on several occasions (*France médicale*, January 30, 1891, and in the same, April 6, 1894). I have observed that this failure of cicatrization is usually associated with diabetes or albuminuria, especially with albuminuria, to the extent that when I have not examined into the state of the urine of a patient the delay in the formation of the aqueous humor has led me to direct my attention to the existence of one of these dyscrasias. The patient of Dr. Trouseau whose case is reported by Dr. de Spéville is an example of this coincidence. I have also noted and indicated as a conclusion from my observations that the only means of hastening the re-establishment of the anterior chamber is by practising iridectomy—an observation which is corroborated by the above cases.—VALUDE.

II.—REPORTS OF SOCIETIES

CONGRESSES

OPHTHALMOLOGICAL SOCIETY OF HEIDELBERG

Twenty-ninth Session, held August 5 to 7.

Erythropsia.

DR. FUCHS (Vienna) thinks that a glare is the sole factor in cases of erythropsia, and that the seat of it is in the retina. In short, erythropsia is found among those persons who travel over fields of snow, and it is rare on the plains. Among patients operated upon for cataract, the phenomenon is monocular if one eye has been kept covered. Colored glasses have the effect of diminishing the glare.

The author has noted that the point of fixation which corresponds to the macula does not appear red except in cases where there is strong excitation; the cones, in this case, would not be the seat of the erythropsia. As the rods are impregnated with visual purple, it is probable that the phenomenon of erythropsia is due to an excess of the production of this purple under the influence of an excitation caused by strong light and by a very active regeneration.

Dr. Greef (Berlin) has observed a case of erythropsia where the patient could only distinguish between red and black; any other color was not perceived.

Operative Treatment of Myopia of High Degree.

DR. A. VON HIPPEL (Halle) communicates the result of a statistical investigation bearing upon 60 subjects affected with myopia from 10 to 24 dioptries, and of variable age, from childhood up to thirty-five or fifty years of age. Lesions of the choroid, even when extensive, are not found to be aggravated after an operation.

Intervention has consisted in an incision with a needle after the use of atropine, and then, eight hours after, evacuating the soft masses without performing iridectomy.

In three cases vision became equal to 1. Usually, vision has increased from four to six times what it was before intervention. In all cases the patients preferred the eye which had been operated upon to the one remaining untouched.

The author has not seen any accident occur consecutive to the operation, such as glaucoma or retinal detachment.

Dr. Sattler (Leipzig).—His experience is based upon 86 cases in which myopia varied from 15 to 20 dioptries. In fact, under 12 dioptries the operation is not indicated. The majority of his patients were young subjects, from ten to fifteen years old. Visual acuity after the operation was examined for near vision; it was not improved in as great a proportion as is stated by Fukala. In 18 cases improvement was inappreciable; in 28 cases amelioration was slight, for vision only increased from 1 to $1\frac{1}{2}$.

His operation also consisted in discission followed by evacuation of the soft masses and irrigation of the anterior chamber.

The author does not look upon extensive choroiditis as a counter-indication. In his 86 cases he has met with retinal detachment four times, and infection twice.

Dr. Fuchs has seen myopia progress in a young person after the extraction of both lenses. The operation cannot, then, pretend to arrest the progress of myopia.

Dr. Thier (Aix-la-Chapelle), in the 50 cases which he has operated upon, has seen retinal detachments occur, but these detachments, in his opinion, might have occurred if no operation had been performed.

He considers the operation as being indicated in cases where the myopia exceeds 15 dioptries.

Dr. Haab (Zürich) stated that in his operations infection of the eye was relatively frequent and formidable; it is also necessary to carefully avoid touching the vitreous humor. His results in 22 cases were good; he performs the discission with two needles.

Infectious Keratitis.

DR. UTHOFF (Marbourg) thinks that in cases of hypopyon the pus comes from the infected iris, and not from the cornea. This pus is, moreover, devoid of any power of infection so long as the cornea has not undergone perforation, as is well shown by the great infrequency of infection spreading to the interior of the eye in cases of hypopyon.

The last publications of Verdesse and Fuchs support this view.

It is probable that the infectious quality of an ulcer of the cornea is very different, according to whether it is a simple ulcer or a serpiginous ulcer in progress.

Conjunctivitis Inducing Bone Formation.

DR. LEBER (Heidelberg) saw in a young woman a conjunctival infiltration characterized by crystalline masses and amorphous granules of carbonate of lime, forming white, hard, and disseminated plaques. There were no microbes.

Growth of the Eye.

DR. WEISS (Mannheim).—Measurements made on the eyes of the new-born and of the adult show that the volume of the eye increases three or four times, while the volume of the entire body increases in the proportion of 1 : 21. Curves show that the increase in the volume of the eye is proportionate to the increase in the volume of the brain. All the diameters of the eye increase symmetrically.

The So-called Anterior Ciliary Nerves.

DR. AXENFELD (Marbourg).—The descriptions of the anterior ciliary nerve given by various authors are contradictory. From dissections and the study of serial sections the author obtains the following results :

1st. There are episcleral branches of the ciliary nerves which go toward the cornea, but their relation with the interior of the eye cannot be found. Optic neurotomy causes their degeneration.

2d. There are nerve filaments formerly unknown which traverse the anterior portions of the sclera transversely. They are of variable diameter, and it has been impossible to determine their origin and their nature.

Palpebral Lipoma.

DR. VOSSIUS (Giesoen) has observed the case of a man fifty-six years old who had on the upper lid a round tumor, the size of a nut, which developed in a few years. Intervention proved that this was an encapsulated lipoma.

Experimental Investigation of the Pathogenesis of Sympathetic Ophthalmia.

DR. BACH.—His experiments were made with staphylococci of different virulence and with the bacilli of tuberculosis. He was not able to verify a passage from one eye to another by means of the optic sheaths.

Furthermore, after enucleations performed for sympathetic ophthalmia, either in the course of or at the beginning of the disease, bacteriological examinations of the nerve or of the organ itself were negative.

On the other hand, any stimulation whatever of the ciliary nerves of one eye was followed in the other eye by disturbances appreciable on microscopic examination. These consisted of a fibrinous excretion collecting in multiple foci and of extravasation of blood corpuscles. The seat of these lesions was the anterior portion of the vitreous humor, the ciliary walls, the anterior and the posterior chambers. Here and there were formed swellings of the epithelium of the ciliary processes, and in the vesicles thus formed was a fibrinous precipitate.

The author thinks that these coagula of fibrin were the initial lesions in the sympathetic process.

Irritation starting from the sympathizing eye will follow the following centripetal canals: the ciliary nerves, the ciliary ganglion, especially the sympathetic root of the carotid plexus of the great sympathetic; from thence, by the circle of Willis, it will travel to the sympathetic of the other side to reach the sympathized eye by the centrifugal canal of the ciliary nerves, and especially by the vascular nerves.

Giant Cells about Foreign Bodies.

DR. WAGENMANN (Jena) has remarked that giant cells are encountered in various lesions both around foreign bodies and in their organic derivatives. Thus, giant cells are found in chalazium and about cysticerci. He has recently seen them near an old spontaneously dislocated cataract.

Anatomical Study of Retinal Gliomas.

DR. GREEF (Berlin) has applied the Golgi-Cajal method, which gives such beautiful results in brain investigations, to the study of glioma. His histological examinations have shown him that by this method very fine impregnations are obtained of the gliomatous cells, which appear with so much the greater distinctness as the other elements are not colored. The neuroglia cells constitute the fundamental mass of the tumor, resembling the network of embryonic cells described by Retzius.

Decussation of Nerve Fibres in the Chiasm.

DR. MICHEL (Wurzburg) presented some preparations in which it was shown that decussation was total not only in the cat and dog, but also in man.

Currents of the Aqueous Humor in the Anterior Chamber.

DR. LEBER states that injections of fluoresceine, by means of which

currents have been demonstrated in the aqueous humor, are a source of error. This substance is so diffusible that it passes through all the vessels, but it is not so of the aqueous humor.

He does not think that the membrane of the iris is interested in any way in the secretion of the aqueous humor; the latter comes exclusively from the ciliary processes.

In his opinion there is not, properly speaking, a current in the anterior chamber, for secretions of fluids in the healthy eye take place very slowly.

Interstitial Keratitis.

DR. VON HIPPEL, JR. (Heidelberg), agrees with those who think that interstitial keratitis is not invariably of specific nature and of hereditary syphilitic origin. If sufficient investigations are made it will be found that in one-third of the cases it is impossible to discover a syphilitic history. He thinks that this form of keratitis may depend upon an affection of the uveal tract transmitted through the canal of Schlemm, which will be altered as the results of uveal lesions.

This is proved by the fact that this form of keratitis is seen with paludal infection, and that it has been observed among animals. Tubercular subjects are exposed to it in quite a large proportion, and he himself has seen three cases of it in persons with cardiac rheumatism.

Dr. Vossius agrees with Dr. Hippel, and he has also noticed interstitial keratitis coexistent with tubercular lesions of the iris.

Dr. Michel stated that he had described a variety of tubercular parenchymatous keratitis which starts in the canal of Schlemm and then extends to the cornea and the iris. In his opinion syphilis is the cause in only half of the cases. As treatment he employs guaiacol or preferably creosote.

Dr. Wagenmann (Jena) has observed a case of interstitial keratitis following influenza.

Dr. Sattler, while recognizing the exceptional influence of malaria, rheumatism, and certain nasal affections, thinks that hereditary syphilis still remains the preponderating factor in this affection.

Tuberculine gives good results in tubercular lesions of the eye, provided a small enough dose is used—one which is insufficient to cause fever.

Dr. Manz (ri bourg) thinks that in interstitial keratitis there are isolated spots which become permanent and are of tubercular nature, and that these nodules are probably tubercles.

Study of the Sensitiveness of the Cornea.

DR. KRUCKMANN (Leipzig) has investigated the sensitiveness of the cornea with Fey's apparatus, composed of fine hairs. With this instrument the sensitiveness of the cornea and of the conjunctiva may be studied with great exactness, and the results, especially in glaucoma or herpes of the cornea, are important.

In tabes it is interesting to know whether there is sensory paralysis of the trigeminus, and this may easily be verified with this apparatus. Changes of intra-ocular pressure produced by the action of myotics or mydriatics have a sufficient reaction on the sensitiveness of the cornea to be determined by this instrument.

Rodent Ulcer of the Cornea.

DR. ZIMMERMANN (Jena), in this affection, recommends incision by Sæmisch's method, or curetting, or cauterization. He has tried sub-conjunctival injections of sublimate with no success.

Dr. Nieden (Bochum) has been well satisfied with the actual canter, which he prefers to any other method, in more than 2,000 cases of *ulcus serpens*.

Dr. Kalt (Paris) has obtained good results with these injections, but success was not constant. They may, however, be tried, as they are inoffensive.

Dr. Bach adds that he has never had a favorable result from injection.

Medical Treatment of Glaucoma.

DR. GRÜNOW (Breslau) has seen cases of glaucoma improved from the standpoint of the ocular tension for years by the continued use of eserine and pilocarpine. The visual field, however, was not modified, and excavation of the disc did not cease to progress.

Dr. Dufour (Lausanne).—Strong light frequently acts, in glaucomatous persons, as a myotic, by contracting the pupil. He has seen cases of glaucoma exaggerated by the influence of darkness.

Gummas of the Ciliary Body.

DR. OSTWALT (Paris) communicated a case of an old syphilitic patient who had a grayish infiltration of the borders of the cornea with iritis. A new growth formed rapidly in the iris at the iridian angle, and this was followed by an attack of glaucoma. All these symptoms disappeared rapidly under energetic specific treatment.

Hepatic Ophthalmia.

DR. HORI (Tokio) reported a case of a patient forty years of age, with cancer of the biliary ducts, and who also had xerosis and infectious keratitis. He also had very decided visual disturbances, hemeralopia, and complete achromatopsia for red and green, without appreciable ophthalmoscopic lesion.

The autopsy revealed the existence of a retinal oedema.

Dr. Leber supposes that in icteric persons affected with hemeralopia there should be an oedema of the retina capable of preventing the production of the retinal purple. In any case, the patient should be kept in darkness.

Dr. Meyer (Paris) has observed pigment spots in the neighborhood of the retinal vessel and a condition of degeneration of the wall of these vessels in tabetic patients with hepatic affection, and who suffered from visual disturbances with hemeralopia. Critchett has noticed identical lesions in similar cases.

Extraction of Pieces of Steel by Powerful Magnets.

DR. HAAB uses a magnet weighing 38 kilogrammes, which enables him to withdraw pieces of steel lodged in the interior of the eye and to draw them out by the same path by which they entered, even through the lens and the anterior chamber. This magnet is far preferable to small magnets, which must be introduced into the eye.

In 60% of the cases observed the foreign body lodged in the deep portion of the eye was withdrawn and vision re-established.

Dr. Wagenmann doubts the action of powerful magnets when the foreign body is lodged in a vascular portion of the eye, such as the ciliary body. He fears that the strong attraction will produce ruptures and serious accidents.

Treatment of Purulent Ophthalmia by Extensive Irrigation with Permanganate of Potash.

DR. KALT.—Treatment with extensive irrigations, such as were introduced in the isolated ward of the Quinze-Vingts in 1894, has been used since then in the treatment of all cases of ophthalmia and purulent catarrh by my colleagues, Drs. Troussseau and Chevallereau. In examining my personal statistics I find that 105 cases of ophthalmia of the new-born, 13 cases of blennorrhœic ophthalmia of adults, and 48 cases of purulent conjunctivitis in children and adults—in all, 156 cases—have been treated in this way. The purulence has always

been modified with great rapidity; in fact, about the fifth or sixth day the purulent effusion was very slight. Ophthalmia in children is generally cured in twelve to fifteen days.

The irrigations should be made three times a day for the first two days, and then twice a day, passing through each eye one and one-half to two litres of a warm solution ($25^{\circ}\text{C}.$) of a $\frac{1}{1000}$ solution of permanganate (a teaspoonful of the saturated solution to one litre of water). I have only rarely seen superficial ulcerations in the course of the treatment. If there are already deep ulcerations, irrigation should be carried on without fear.

The funnel which I employ is made of glass, in three sizes. Pressure should not exceed 40 centimetres.

If there are gray false membranes (streptococci) it is well to add to the $\frac{1}{1000}$ solution of permanganate $\frac{1}{10000}$ of sublimate—that is, 10 c. c. per litre of a 1 per cent. solution of sublimate. The fluid should be slightly warm—that is, its temperature should be about $25^{\circ}\text{C}.$

Nothing prevents the concurrent use of canterizations with $\frac{1}{10}$ of nitrate of silver, but I think they are useless.

BRITISH MEDICAL ASSOCIATION

Sixty-third Annual Session, held at London, July 31 to August 3.

OPHTHALMOLOGICAL SECTION.

MR. HENRY POWER, the *President*, greeted the members of the Congress and called attention to the progress made in our specialty. In 1842, six dispensaries made a diagnosis of conjunctivitis 16,383 times among 30,971 patients. The greater part of these cases would to-day be classed in a different manner.

A Case of Acromegalia with Ocular Complications.

MR. BENSON (Dublin).—The patient was a man thirty-eight years old, with toxic amblyopia, who, in addition to the classical symptoms of acromegalia, had an irregular temporal hemianopsia with considerable oscillations in central vision.

Mr. Swanzy (Dublin) remarked that the skeleton of the Irish

giant, Cornelius Mayrath, preserved in the Museum of Trinity College, Dublin, had the characteristic deformities of acromegalia. The *sella turcica* was dilated so that it could hold a small nut; the fossa for the chiasm and the clinoid apophysis had disappeared.

The result of the discussion was that temporal hemianopsia, with or without discoloration of the discs, is met with in most cases of acromegalia.

Periodic Episcleritis.

DR. FUCHS (Vienna).—Periodic episcleritis is a disease of adults, more frequent with men than with women. It may last for years, and may be double or unilateral. It is a painful affection, producing extensive alterations in the diseased eye. It is localized about the ciliary and episcleral vessels, and either surrounds the entire cornea or is restricted to a sector of it. The iris and cornea are commonly unaffected, but the latter may become clouded in severe cases, and the injected portions, as well as the lower lid, are sometimes oedematous. The pupil may be contracted, as in accommodation. Photophobia and lachrymation are more pronounced than pain. The duration of the inflammatory attack varies from twenty-four hours to eight days. This may be preceded by a febrile movement, an eruption of urticaria, or a characteristic coryza.

Injections of Lime Water Into the Vitreous Humor.

MR. BERRY (Edinburgh).—After incision of the conjunctiva a Græfe knife is introduced into the eyeball at the equator, between the inferior and external recti muscles. With a Pravaz syringe four drops of lime water are injected into the centre of the vitreous humor. Purulent infiltration of the vitreous is not improved by these injections, but they are useful in commencing septic infection of the eye—for example, after extraction of foreign bodies.

Sarcoma of the Choroid in Children.

MR. JOHN GRIFFITH.—I have had occasion to see two cases of unpigmented sarcoma of the choroid, one in a child two years and a half old, the other in a child four years old. I think this neoplasm is more common than is supposed. Glioma should be considered as a sarcoma.

Hereditary Congenital Nystagmus Associated with Movements of the Head.

MR. MACGILLIVRAY (Dundee).—I have had occasion to trace the

heredity of nystagmus through four generations. The affection was transmitted by the women to children of the male sex.

Diagnosis of Orbital Tumors.

MR. SWANZY (Dublin) emphasizes the necessity of trying medical treatment (mercury, iodine, arsenic, and serotherapy) before proceeding to operation.

Pseudo-Malignant Tumors of the Orbit.

DR. PANAS (Paris).—A number of cases of exophthalmus where there was supposed to be a malignant tumor of the orbit have been cured by medical treatment, or after erysipelas. These affections are regarded as of syphilitic origin. I think that some of these cases of exophthalmus, formerly interpreted by the presence of lymphomas, sarcomas, and syphilomas, should be attributed to the action of toxine. One of my patients, thirty-six years old, had an exophthalmus identical in all points with that produced by sarcoma of the orbits, and this was completely cured by internal administration of arsenate of soda. The patient was not syphilitic, and iodide of potassium had only aggravated his condition. I think that the exophthalmus was due to orbital cellulitis, dependent in its turn upon ozæna. The swelling on the sides was more marked on the nasal than on the temporal side. A young woman, non-syphilitic, had exophthalmus of the left eye associated with a polypus in the left nostril, which was at first supposed to be sarcomatous. Cases of this sort are numerous. In another series of cases the affection resides in the lachrymal gland.

The Influence of the Brain and Cerebellum on Ocular Movements.

MR. RUSSELL.—I have found in the dog and the cat distinct centres in the cerebral cortex for every movement of the eyes. When the ocular muscles are intact the invariable result of stimulation of the frontal ocular region is a conjugate movement of both eyes toward the opposite side. When this movement has been rendered impossible by section of the internal rectus on the side of the stimulated hemisphere, and of the external rectus of the opposite side, a centre can be demonstrated stimulation of which produces simple rotation upward. After section of the elevator muscles a centre may be discovered stimulation of which produces downward rotation of the eyes.

Latent Hypermetropia in the Visual Examination of Candidates for Public Service.

MR. BEAUMONT (Bath).—This question should be regulated.

In spite of the principle of only admitting emmetropes into the marine service, the rules do not mention the methods to be employed in discovering latent hypermetropia. It frequently happens that hypermetropic candidates pass with ease, and that the oculist who passed them receives an unmerited reprimand.

Operations in Chronic Glaucoma.

MR. NETTLESHIP (London).—Many cases of chronic glaucoma depend upon moral depression and are passing in character. They recover by change of occupation, in the course of time, and by the use of general or local remedies, such as eserine. Puncture of the sclera, while it is efficacious in acute glaucoma, is of no avail in chronic glaucoma. The different forms of chronic glaucoma should be carefully studied. There is a special form associated with disturbances of menstruation which is not cured by iridectomy.

Mr. Critchett is of the opinion that chronic glaucoma requires immediate treatment. In one of his cases the disease had existed for nine months in the left eye before it appeared in the right. In spite of double iridectomy, increase in tension reappeared in the left eye. The establishment of a cystoid cicatrix is of the greatest importance, and the operator who will find a method assuring its formation will deserve the highest commendation. In a case of chronic double glaucoma in which both eyes were operated upon at St. Mary's Hospital increase in tension reappeared on one side, while recovery was lasting on the other side, where there was a cystoid cicatrix.

Messrs. Priestley-Smith, Swanzy, and Little recommended immediate operation, while *Mr. Adams Frost* thought that medical treatment should precede an operation.

Several speakers stated that sclerotomy should only be performed in the coloboma of an iridectomy when the latter had been insufficient. *Mr. Richard Williams*, on the other hand, was in favor of primary sclerotomy, while *Mr. Gayet* considered this operation as giving greater satisfaction to the operator than to the patient.

SOCIETIES

THE MEDICAL AND SURGICAL SOCIETY OF BORDEAUX

Session of July 5.

Dislocations of the Lens.

DR. SOUS.—What must be done when a transparent or opaque

lens escapes into the anterior chamber and its presence is not accompanied with any symptom of reaction or disturbance of the circulation of fluids ?

In cases of this kind it has been advised to attempt reduction—that is to say, to transfer the lens behind the iris. The pupil is dilated by means of atropine, and the patient placed in bed in the dorsal position. The lens, by virtue of the laws of gravity, passes behind the iris. When this result is obtained collyrium of eserine is instilled in the eye to contract the pupil and thus prevent the forward passage of the lens. The patient is kept in bed, and is treated like a person operated upon for removal of cataract. To accelerate this reduction Rampoldi, in 1885, advised massage of the eye. Others have advised slight movements of the head.

This method of treatment, which is most simple, can only be employed when the lens is diminished in size and perfectly movable in the anterior chamber.

If the lens has preserved its transparency and its size, abstinence from all treatment has been recommended.

What is to be hoped for from this expectant treatment ? Absorption of the lens is awaited.

To favor absorption of the lens, Soelberg-Wells has proposed discission, and repetition of this operation as often as necessary. This process seems to me to be dangerous. With a young lens an extensive discission will cause swelling of the lens, an increase in volume, and consequently, pressure on the iris, resulting in inflammatory symptoms and glaucoma. More important surgical treatment is thus required. In the presence of a lens with a hard nucleus, repeated discissions will not be followed by complete absorption of the lens. Von Græfe did not have a successful result from discission.

If reduction does not take place, and if expectant treatment is not adopted, should extraction be performed ?

A lens in front of the iris, whatever be the tolerance of the eye, is none the less a foreign body in the anterior chamber, and it is easily understood how the first idea which occurs to one is extraction. How should this operation be performed ?

The danger of extraction is the more or less abundant escape of the vitreous which is the rule when synchysis is the predisposing cause of the dislocation.

A. Sichel recommends, properly, the use of chloroform to avoid contractions of the eye-muscles and quick movements of the patient ; it

is a good precaution to obtain absolute immobility and as far as possible to oppose the escape of the vitreous.

According to some, the cornea should be sectioned above, and according to others, below. Below, the section is difficult, as the lens occupies the lower portion of the anterior chamber. Above, the knife has freedom of action. With inferior section, the knife may be used to hold the lens, while with superior section there is danger of the lens passing behind the iris.

To avoid this backward passage, it has been proposed to seize the lens and hold it with needles or hooks, and to use eserine, so as to have a very small pupil as an obstacle to the backward passage of the lens.

Dr. G. Martin.—Extraction of dislocated lenses is often difficult. It is proper, therefore, whenever one is confronted with this operation, to consider all the difficulties which may occur.

In my opinion, cocaine should never be employed to anaesthetize an eye when the vitreous humor is soft.

Under the influence of muscular contraction due to cocaine, a softened vitreous has certainly a greater tendency to escape outside by the large wound which it is necessary to make to give exit to the lens.

With chloroform, nothing of this sort occurs. When anaesthesia is complete, a dislocated lens may be extracted without fear of prolapse of the softened vitreous, and I have thus made it a rule to use general anaesthesia in all cases of dislocation of the lens. Thanks to this precaution, I have lately removed two dislocated lenses, one behind the iris, the other in front of it, without the slightest escape of the liquefied vitreous.

SOCIETY OF MEDICAL SCIENCES OF LYONS

May Session.

Cerebral Traumatism ; Atrophy of the Optic Nerve.

DR. H. DOR.—A man received a blow on the skull from the crank of a windlass. The injured man was unconscious for three days. On regaining consciousness he found that he could no longer see with the left eye nor hear with the left ear. Commencing atrophy of the optic nerve was found. If a screen was placed before the right eye, the left pupil dilated, but it contracted when the screen

was removed. Hoelder (Stuttgart) has made statistical investigations of the symptoms following cranial traumatism, and in more than half the cases he has noticed fracture of the optic canal.

The mydriasis is not paralytic, but is of the same nature as the mydriasis of amaurosis.

The anatomical diagnosis in this case was that of a lesion of the upper portion of the optic canal. Hemorrhage is common in such cases, but it is not the cause of blindness, for the latter would then develop slowly and progressively, which was not so in this case.

PHYSIOLOGICAL SOCIETY OF BERLIN

Session of July 27.

Stellate Cells of the Optic Nerve.

DR. GREEF.—Golgi's method shows the presence in the optic nerve of stellate cells similar to the cells of the neuroglia of the brain. The latter are distinguished as stellate cells with long processes and with short processes. The first are found in the white substance of the brain, and the latter in the gray substance. The optic nerve, which is a prolongation of the white substance of the brain, contains cells with long processes. Cells of this kind are also found in the retina.

III.—BOOK NOTICES

BOOKS AND THESES

Perimetry, by DR. VON OLE BULL. (Bonn. Friedrich Cohen, pub. 1895. 218 pp. and 174 figs.)

Dr. Ole Bull has recently given the physiological principles of perimetry to the readers of the *Annales* (see these *Annales*, Vol. CX., p. 169). This bibliographic review enables me to dispense with mentioning the first part of his book, which treats of perimetry by means of colored pigments. But I should state that there is a very instructive plate, giving by curves the results obtained by measuring the visual acuity, luminous perception, and perception of colors for the entire visual field.

This first part, physiological perimetry, is followed by chapters treating of alterations in the visual field. They are most valuable from the great number of diagrams of visual fields which are given, and from the great care with which these visual fields have been measured. Frequently a sketch of the ophthalmoscopic picture is placed beside the visual field and abridged descriptions are given under the diagrams. The reading of this book thus produces the maximum effect with a minimum effort on the part of the reader.

The chapter devoted to the visual field in functional neuroses (hysteria, neurasthenia, etc.), excellent in what concerns the purely perimetric part, is lacking in precision as to what concerns the diagnosis and nosography of nervous diseases. This slight imperfection, which will be noticed by those who have followed the teachings of the Salpêtrière, does not detract from the great value of Dr. Ole Bull's book, which will encourage all his readers in making perimetrical examinations.—SULZER.

Treatment of Diseases of the Eyes, by Dr. TROUSSEAU.
(Paris, O. Doin, éd.)

A handy little book of 160 pages, in which the author gives a summary description of the diseases of the eyes and the indications for their treatment.—V.

Myopia, Hyperopia, and Astigmatism, by Dr. GEORGES MARTIN.
(314 pp. and 58 figs. Rueff & Co., Paris, 1895. *Bibliothèque médicale, Chareot-Debove*.)

The special articles of Dr. Martin on the various subjects connected with ocular refraction have for years pointed him out to his colleagues as the future author of a general treatise on the errors of refraction. This book has now appeared, and does not disappoint the expectations of those who awaited it. With great clearness of perception and exposition, the author understands how to present to any cultivated man this difficult subject of ocular refraction and its anomalies. That it may be easily understood by the laity, the elements of ocular optics, anatomy, and physiology are briefly discussed in an introduction.

Instead of considering the three anomalies of refraction separately Dr. Martin treats them simultaneously. This enables him to contrast their points of similarity and their differences. It is to this arrangement that Dr. Martin's book principally owes its unity and clearness.

This treatise will be of great service to those who are directly or indirectly interested in this subject. The wide diffusion of correct ideas of myopia is probably the best means of prevention of this anomaly of refraction, and Dr. Martin's book seems to me destined to interest the general public in this question.—S.

Contribution to the Functional Examination of Peripheral Portions of the Retina, by Dr. ALBERT SENN. (*Berne Thesis*, 1895.)

The luminous perception of the peripheral portions of the visual field is disturbed in all affections of the optic nerve, the retina, and the choroid. Its diminution forms one of the earliest symptoms of these diseases. Slightly pronounced in affections of the optic nerve, it reaches a high degree in glaucoma and alterations of the membranes.

Dr. Senn has determined the deepest shade of gray (*gris limite*) which gives the normal perimetrical limits of the normal eye. He employs this color in examining the luminous perception of the peripheral portions of the retina. Comparison of the visual fields obtained with a white object and with a gray object gives valuable information as to the intensity and prognosis of the affection, as well as for the differential diagnosis between functional and organic narrowings. It becomes a valuable method in discovering simulation. In hysterical contractions the limits obtained with gray and white coincide. In organic affections they are the nearer to each other as the process is the more intense.—S.

MEDICAL JOURNALS

The Bandage as a Test of the Eye Before Operation, by Dr. NUEL. (*Annales de la Société médico-chirurg. de Liège and Scalpel*, July 14, 1895, p. 12.)

It is possible to render the surface of the eye sufficiently aseptic. But this asepsis may not persist. Occlusion of the eye, necessary to immobilize the wound, is a favorable circumstance for the development of microbes. According to Nuel, infection almost always occurs on account of this post-operative development of pathogenic microbes. The truth of this proposition, which is of the greatest importance, is shown by the observation of eyes closed by a bandage.

The author has noticed that twenty-four hours after operation the eye operated upon, which was previously treated with antiseptic pre-

cautions, was pale and dry, while the other eye, which had not received preparatory antiseptic care and was also closed, was red and secreting; in other words, it was in a condition which would have been most serious if it had been operated upon.

He has also closed eyes not operated upon for twenty-four hours, and he finds that those which have no affection, such as a slight conjunctivitis, obstruction of the lachrymal ducts, or a slight blepharitis, are irritated and secreting, as the result of the application of the bandage. Pathogenic microbes have developed in it.

Nuel finds, in the application of a bandage for one or two days, a method of determining eyes which cannot with safety support ocular occlusion.

The bandage thus becomes a criterion, enabling one to determine whether an eye is sufficiently aseptic to proceed to operation. I employ this test, says Dr. Nuel, in all cases where the eye has the slightest blemish, and do not proceed to operation until sufficient asepsis is obtained, revealed by another application of my criterion. I have employed this method for six years, and since using it have not observed a case of infection. I have also had the great satisfaction of learning that many of my colleagues have verified the excellence of this method.—DASTOT.

The Efficacy of Applications of Tincture of Iodine in the Treatment of Infectious Ulcers of the Cornea, by Dr. VAN DEN BERGH. (*La Presse médic. Belge*, August 11.)

The author first states that the present means of combating rodent ulcers of the cornea, such as Sæmisch's transfixion, topical applications of iodoform, pyoctanine, and sub-conjunctival injections of sublimate, do not always produce the hoped for result. He then remarks that the red-hot iron recommended by Gayet has this fault, that, if it prevents the progress of the disease, it destroys whatever it touches.

He has thus been led to try applications of tincture of iodine directly to the ulcer, which was first proposed by Chibret, and later by Koller, who seems to have ignored the work of his predecessor.

The result obtained by Dr. Van den Bergh was so demonstrative that his case deserves to be reported in full:

Early in July, 1895, a workman came to my clinic who had been suffering for three days from an infectious ulcer of the cornea.

The ulcer, round, and about 4 millimetres in diameter, extended from the border of the lower external segment of the cornea to the centre of the pupil.

The characteristic yellow peripheral border, in the shape of a half-moon, indicating the course which the ulcerative process would pursue, was situated toward the pupil, threatening total destruction of the cornea. A thick hypopyon filled the lower quarter of the anterior chamber.

On the first day, I made an application, morning and evening, with tincture of iodine, by means of a little rolled wad on the blunt end of a Bowmann's sound. The application was carefully made, so as to cover the entire surface of the ulcer to its furthest limits. The yellow semi-lunar border was also carefully touched.

Atropine and a compress bandage. Quinine and morphine for the headache, which was very severe.

On the next day I found that the ulcer had not progressed, nor had the hypopyon increased.

After eight days, applications being made first twice and then once a day, the ulcer was completely cicatrized. To-day, after a month, in the place of the ulcer is only seen a cloud which tends more and more to disappear.

Vision is good.

I agree, adds Dr. Van den Bergh, with Chibret and Koller :

In the treatment of infectious ulcers of the cornea applications of tincture of iodine constitute the surest and simplest method, and, an advantage of no small account, this method is at the disposal of every general practitioner. Some practice is necessary to properly manage the thermo or galvano-cautery. Sub-conjunctival injections of sublimate, proposed by Abadie, in addition to the fact that they have not yet been sufficiently proved, are not easy of execution in the hands of the ordinary physician. Applications of tincture of iodine, on the other hand, are easily performed, and are absolutely inoffensive.

If by chance the application slightly overlaps the limits of the ulcer, there will be only a slight desquamation of the corneal epithelium, which will be restored without leaving a trace.—V.

Papillary Reaction in a Case of Post-Neuritic Atrophy, by Dr. GOULD. (*Journal of Nervous Mental Diseases*, April, 1895.)

A girl twelve years old, with symptoms of cerebral disease, had a double intense papillitis, with complete amaurosis, and mydriasis without pupillary reaction. Six months later the optic nerves were found to be atrophied, and in six months more they were completely white. There was neither luminous perception nor reaction of the pupils, which were dilated to the maximum. But when the patient

was placed before a window facing a wall exposed to the sunlight the pupils slowly contracted. When the child plays in the sun the pupils are of normal size, while they are dilated to the maximum in the house. The movements of contraction and dilatation occur too slowly to be observed.—S.

Cure of Trachomatous and Scrofulous Keratitis by Palpebral Relaxation (Blepharochalasis), by Dr. SCHWABE. (*Deutsche medic. Wochenschrift*, May, 1895.)

After performing canthoplasty the author excises an oval flap from the upper lid, 20 millimetres in length, and with the large arc horizontal, and a similar flap, 10 millimetres in length, from the lower lid. The skin excised from the upper lid is situated over the tarsus; on the lower lid it is taken from the temporal portion of the lid. The author thus succeeds in correcting the entropion and bringing about a prompt recovery from the corneal affections engendered by pressure of the lids.—S.

Ophthalmia of the New-born, by Dr. GROSSMANN.
(*Pester med. chir. Presse*, August 11.)

Dr. Grossmann considers that the misfortunes of ophthalmia of the new-born depend in a large part on the negligence of midwives, and, in his opinion, the best method of diminishing the danger of this disease is to oblige the midwives to summon a physician at the first symptom of ocular inflammation (this is, in fact, what we have always maintained, and there is a law to this effect in most of the United States.—V). Dr. Grossmann, in twenty-three years of practice, has proved the excellence of this measure.—V.

IV.—MISCELLANY

NECROLOGY

Dr. VIALET (Paris), Dr. GROS (Boulogne-sur-Mer), Dr. NAGEL, Professor of Ophthalmology of the Faculty of Medicine of Tübingen.

Dr. Nagel founded and successfully directed a publication which has been of the greatest service to investigators. The *Jahresbericht für Ophthalmologie*, as its name indicates, appears once a year, and contains a *résumé* or notice of all that is published in ophthalmology in every country. Ophthalmological literature of the last twenty-five years is thus completely recorded in Nagel's *Jahresbericht*.

ANNALES D'OCULISTIQUE

Volume CXIV.—Number 4.

OCTOBER, 1895.

I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

CONCERNING A CASE OF SUPPURATIVE IRIDO-CHOROIDITIS TERMINATING IN RECOVERY

By Dr. V. MORAX, late Hospital Interne.

Zimmermann recently published (1) a clinical description of a case of suppurative irido-choroiditis which terminated in complete recovery. The following is a summary of this case:

The patient, a sailor twenty-nine years old, had had three different attacks of urethral blennorrhœa. Three weeks after the second attack he had poly-articular gonorrhœal rheumatism which kept him in bed for four and a half months. The third attack, which occurred three years ago, was also followed by articular disturbances of two months' duration. He now has a urethral stricture. Zimmermann does not state whether there is chronic urethritis.

On October 10, 1894, the right eye became sensitive and injected. The next day the lids were swollen. The pain increased to such an extent as to prevent sleep.

On October 15 ophthalmological examination revealed marked swelling of the lids and conjunctival chemosis. The cornea was slightly clouded, the iris discolored, the pupil contracted and filled with a gray exudate. A small hypopyon occupied the lower portion of the anterior chamber. Ocular tension was normal. The fundus of the eye could not be illuminated. The patient could with dif-

(1) ZIMMERMANN: *Klinische Beobachtungen*, etc. (*Klinische Monatsblätter für Augenheilkunde*, February, 1895, p. 45.)

ficulty perceive movements of the hand at a few centimetres from the eye.

Atropine was instilled and sub-conjunctival injections made of a tenth of a milligramme of sublimate. On the next day there was decided improvement. The patient counted fingers at 5 metres. The hypopyon was absorbed, and the pupil dilated, but the fundus of the eye was still invisible. The pain had diminished, but the eye was still sensitive to pressure on the ciliary region. Improvement still continued on the following day, October 17. On October 18 the patient's condition was aggravated, he could no longer count fingers, and the pain and insomnia had reappeared. After this the sub-conjunctival injections of sublimate were resumed, with instillations of atropine and internal administration of salicylate of soda. On October 22 improvement was manifest, and continued to progress on the following day. October 27, the fundus of the eye could be seen. November 4, the eleventh sub-conjunctival injection was performed. Vision was then $\frac{1}{15}$. December 3, there remained only a few synechiæ and some pigmentary deposits on the anterior capsule. The exudate in the vitreous had completely disappeared. December 8, vision was perfectly normal.

Zimmermann concedes that this irido-choroiditis was of blennorrhœic nature. He attributes recovery to the sub-conjunctival injections of sublimate.

This conclusion seems to me to be somewhat illogical, still more so as the author refers to an analogous case of Rauschenbach (1) in which complete recovery occurred, although the treatment employed consisted of scarifications of the conjunctiva and warm applications.

The following is a case quite analogous to the preceding, and which I observed at Dr. Parinaud's clinic:

Case.—M. Manet——, forty-three years old, of Clichy, came to the clinic March 13, 1895, complaining of loss of vision of the left eye. I found the lids so swollen that the patient could scarcely open them. The cornea was somewhat clouded, and there was a high degree of conjunctival chemosis. The iris was slightly discolored and thickened. The pupil was contracted. An abundant hypopyon occupied

(1) RAUSCHENBACH: A Case of Suppurative Irido-Choroiditis, etc. (*Klin. Monatsbl. für Augenheilkunde*, September, 1894, p. 289.)

the lower portion of the anterior chamber. The vitreous was completely clouded, and the fundus of the eye could not be illuminated. Pressure on the eyeball was painful, but the tension was normal. The patient had suppurative irido-choroiditis. As for the etiology of this affection, I found the following facts:

The patient had always enjoyed general good health. At the age of twenty-six he had his first attack of gonorrhœa, which was cured in a few weeks without complications.

At the age of forty-one he had his second attack of gonorrhœa, which this time was complicated one month after the onset by poly-articular gonorrhœal rheumatism, later localized to the tibio-tarsal articulations, and which compelled him to take to his bed for three months. A few weeks after leaving the Hôtel-Dieu he returned with a relapse. Salicylate of soda and salol had no effect on the articular symptoms.

For two years the patient has had no return of the acute articular disturbances, but complains from time to time of transitory pains in the phalangeal articulations. As the result of his last attack of gonorrhœa he has a urethral stricture and chronic gonorrhœal urethritis. He has occasionally noticed the appearance of a slight purulent discharge in the morning.

The present ocular trouble began on March 2, 1895. On awakening, the eye was injected, and during the day vision was much confused.

This trouble seemed to begin without provoking cause, although the patient attributed it to a blow received eight days before on the left temporo-parietal region.

With the loss of vision the patient had severe pain in the eye, the forehead, and the temples. He did not sleep for five consecutive nights, and then the pain became less continuous, but vision was not improved. He then came for consultation.

From an etiological standpoint, it was proper to suppose that this was a blennorrhœic irido-choroiditis, and, to give a favorable prognosis, collyrium of atropine was prescribed with internal administration of calomel.

The day after the patient came to the clinic the pain disappeared, and vision began to improve slightly. On the following day visual perception was much better, and afterward it continued to improve. The hypopyon was absorbed and the pupil well dilated.

On March 19 the following conditions were noted: The palpebral swelling and the chemosis had disappeared. There remained but

little peri-corneal injection. The pupil was dilated. There were several synechiæ and pigmentary deposits on the anterior capsule. The fundus of the eye could be illuminated, but the details were indistinct on account of the cloudiness of the vitreous. Tension was normal. Pressure on the ciliary region was still somewhat painful. The patient counted fingers at 4 metres.

The treatment employed had consisted solely of instillations of atropine. The patient had only taken two capsules of 0.5 grammes of calomel.

On March 23 the patient was feeling very well, and complained no more of pain. The cloudiness in the vitreous was much decreased. Vision was $\frac{5}{75}$.

On April 6 vision was much improved: $V = \frac{5}{15}$. Since that time I have unfortunately not seen the patient again, and have received no information from him.

We thus see that in this case the patient had chronic gonorrhoeal urethritis, that he had formerly had gonorrhoeal rheumatism, and that without appreciable cause he had been affected with rapidly progressing visual disturbance in one eye accompanied with painful reactionary symptoms, and leading, in twenty-four hours, to almost complete blindness. The pain persisted for five or six days, and then gradually disappeared, while the visual disturbance was not modified. The symptoms were, then, those of suppurative irido-choroiditis. Twelve days after the loss of vision gradual progressive improvement set in, and one month after the commencement of the affection vision had regained one-third its normal acuity. In Zimmermann's case the symptoms of pain and blindness lasted seven days. There was rapid improvement, and then a relapse, and recovery was not in full and gradual progress until the ninth day. In two months vision was restored to its normal condition.

Rauschenbach's case is quite similar to the two preceding:

The patient, fifty-two years old, had suffered from rheumatism (the nature of which was unfortunately not stated). On January 3 the right eye became painful, and vision was almost completely lost in a short time. The pain persisted for about six days, and then diminished. The visual disturbance persisted.

January 11, swelling of the lids of the right eye was noticed with conjunctival chemosis. The cornea was slightly clouded. The iris was discolored, the pupil irregular and filled with an exudate. A small hypopyon filled the lower portion of the anterior chamber. The fundus of the eye could not be seen. Treatment consisted of repeated scarifications of the conjunctiva, lotions of sublimate, and warm moist applications. On January 13 vision began to improve. On the 16th the hypopyon was absorbed, and the fundus could be seen. Improvement continued, and one month later vision was equal to $\frac{1}{2}$.

These three cases seem to me to present so great a similarity in their development that one is led to seek the characteristic which unites them, not in the anatomical lesions, but in their etiology.

This is a very distinct clinical type of the classical form of suppurative irido-choroiditis. Zimmermann's case shows once again how an anatomical classification may lead to erroneous reasonings. Zimmermann doubtless argued thus : My patient has suppurative irido-choroiditis ; the books teach us that suppurative irido-choroiditis is never cured ; the patient was cured, and the result was therefore due to the treatment employed.

The anatomical classification is certainly a convenient one, but it includes in the same group affections essentially different in development and etiology. Is it proper to approximate and to describe in the same chapter affections identical in their lesions (at least during a certain period), but some of which terminate fatally in perforation of the eyeball or atrophy, while others develop spontaneously in complete recovery, whatever be the method of treatment employed ?

In these three cases it seems to me very difficult not to say that recovery was spontaneous. The fortunate result evidently cannot be attributed to scarifications of the conjunctiva in one case, to sub-conjunctival injections of sublimate in another, and in my case to the two doses of 0.5 gr. of calomel which were given to the patient. Atropine was employed in all three cases, but no one could suppose that it had such extraordinary curative properties.

On the other hand, do we not know that atropine has never induced recovery in a case of the form of suppurative irido-choroiditis which is now designated as metastatic ophthalmia, and which has been described in such an interesting manner by Axenfeld (1)? Of all the cases which he collected (metastatic ophthalmias in puerperal or surgical infection, and in medical pyemias or septicemias) there was not one case in which vision was preserved.

It seems to me, therefore, far more logical to acknowledge that this form of suppurative irido-choroiditis which occurs in the course of chronic gonorrhoea is generally and essentially benign, and that its natural termination is in recovery. I do not propose to discuss the nature of this affection. It is probable that, by reason of its benignity and its special development, there is a localization of gonococci, but I cannot state this definitely, since no bacteriological examination could be made, and I simply desire to call attention to this form of irido-choroiditis which, from the clinical point of view, presents such special characteristics in its development.

In the presence of similar cases it would be wrong to depend upon an anatomical diagnosis which would lead to an erroneous prognosis. If an acute or chronic urethral discharge is found, one may without fear reassure the patient and foretell the development of the disease.

One is forced to prescribe some form of treatment—the peculiar mental condition of the patient requires it. But it is hardly proper to attribute the successful result to the therapeutics employed; such reasoning would be similar to ascribing the resolution of pneumonia on the seventh day to the vesication which was applied twenty-four hours previously.

(1) See these *Annales*, Vol. CXIII., p. 445.

THE PATHOGENESIS OF MYOPIA

By Dr. G. BITZOS.

To properly understand the evolution which an emmetropic or hypermetropic eye undergoes to become myopic, it is necessary to understand the first impulse and the first steps of this evolution. For this purpose it is indispensable to study myopia in its earliest manifestations. I have examined the refraction of a large number of persons, and have paid particular attention to the study of the disposition of the scleral ring or crescent in the various conditions of the refraction, a disposition which seems to me to have a close relation to the evolution of myopia in the eye. I have, however, only kept the observations of about 800 persons, comprising exact annotation of the refraction as far as skiascopy carefully applied enabled me to determine it, and a drawing of the peri-papillary phenomena with accompanying explanations, including sometimes other important clinical phenomena.

I have drawn the following conclusions from my investigations, the only ones which I propose to consider :

1st. The scleral ring, far from being constant, is ordinarily lacking in emmetropic or nearly emmetropic eyes, while it exists as such or in the form of a crescent in almost all cases of ametropia.

2d. In myopia, the eye generally commences to have a very narrow external crescent, which increases in size with the increase of the myopia, and at the same time extends and embraces the entire papilla in a circle, as a scleral ring, almost always remaining larger on the external side. This happens more or less quickly, and very frequently the crescent does not embrace the entire papilla as a scleral ring. The scleral ring or crescent then becomes surrounded by a pigmentary ring or crescent, which gives way later to choroidal atrophy. This is also, as a rule, larger on the external side of

the papilla, and in high degrees of myopia it almost always surrounds the papilla. The width of the scleral crescent or ring on the external side is in direct relation to the degree of myopia as well as to the ultimate choroidal atrophy. If before becoming myopic the eye has a scleral crescent or ring, complicated or not with a pigmentary crescent or ring, or also with more or less advanced choroidal atrophy, these phenomena are accentuated with the development of myopia in the eye.

3d. In hypermetropia, the direct relation of which I have spoken also exists, but the crescent rarely develops without becoming a scleral ring. On the contrary, ordinarily, or at least very frequently, the scleral ring is found more or less narrow and larger on the external side. Ultimately, the pigmentary crescent which surrounds the former rarely leads to complete choroidal atrophy; it is ordinarily arrested in its development.

4th. Astigmatism does not seem to influence the direction of the scleral crescent or ring and the ultimate choroidal atrophy, but it seems to accelerate the development.

Peri-papillary choroidal atrophy, which occurs in commencing glaucoma and in many old persons, should be distinguished from the scleral ring. I wish, in passing, to remark that this atrophy in both cases is, in my opinion, of the same nature. This atrophy, if it exists in addition to a scleral crescent or ring, is very easily distinguished in ophthalmoscopic examination, where we distinctly see the latter marked by its white color and its sharp borders on one side of the disc and the atrophy surrounding the other. The scleral crescent or ring is thus frequently differentiated from the surrounding choroidal atrophy.

The scleral crescent or ring is only the peri-papillary portion of the internal surface of the sclera, which is revealed by the enlargement of the choroidal ring. Indeed, macroscopic and microscopic examinations leave no doubt of this fact. The choroidal opening appears to be formed as though by a punch, and allows a circular or crescentic portion of the internal surface of the sclera to be seen. This fact may be easily demon-

strated, as the scleral ring is very common, as I stated above. The retina must first be carefully removed and the peri-papillary region examined with low microscopic enlargement before placing the specimen in any histological solution. I would suggest that any one who has any doubt of this fact should make this examination, since it is a fact of great importance in the problem of the pathogenesis of myopia. Authors of unquestionable authority, such as Panas (1), Schweigger (2), Fuchs (3), and Tillaux (4), confirm it.

According to Stilling (5), the external crescent is only the external portion of the scleral canal, which is seen because the latter is drawn outward. But crescents are not always seen; on the other hand, the scleral ring is more frequently seen with the ophthalmoscope. Kuhnt, and after him Dimmer (6), have replied to this objection, that if a ring were seen it was because the scleral canal was again enlarged in its internal third. This is forcing facts to confirm theories. The scleral crescent or ring of myopia differs in no way from that of hypermetropia, a fact which may be established by examining a few eyes.

Arlt (7) states that in slight degrees of myopia neither the optic nerve nor the sclera present abnormalities. Stilling (8) maintains that detachment of the external sheath of the optic nerve in myopia only occurs in its pronounced degrees. But it is difficult to understand how the scleral ring can be drawn outward in commencing myopia unless the optic nerve is relatively short, and how in this case the scleral canal could

(1) *Traité des maladies des yeux*, 1894.

(2) *Handbuch der Augenheilkunde*, 1893.

(3) *Lehrbuch der Augenheilkunde*, 1894.

(4) *Traité d'anatomie topographique* 1882.

(5) *Untersuch. ü. die Entstehung d. Kurzsichtigkeit*, 1887.

(6) *Der Augenspiegel*, 1893.

(7) *Ueber die Ursachen und die Entstehung der Kurzsichtigkeit*, 1876.

(8) *Transactions of the Ophthalmological Society of Heidelberg, Congress of 1886*, in *Annales d'Oculistique*, Vol. XCVII., 1887.

become deformed before the external sheath was detached. There is no doubt in my mind that in myopia, as well as in hypermetropia, the scleral crescent or ring is only a portion of the internal surface of the sclera revealed by enlargement of the choroidal orifice.

This fact would not be difficult to verify more directly. In fact, if any one would take the trouble to examine by skiascopy the eyes of incurable patients who enter large hospitals only to die, he would certainly see many eyes with a low degree of myopia, at least sufficient to definitely elucidate this question.

In myopia of 1 dioptré the crescent on the external side of the scleral ring is ordinarily, with the inverted image, the size of a large retinal vein. The crescent or ring enlarges with the increase of the myopia, and in myopia of 3 dioptries they are somewhat larger, but are always surrounded by a pigmentary crescent or ring which is still larger. As the myopia increases the scleral crescent or ring also increases slightly, but it is the pigmentary crescent or ring on the external side which is more marked and becomes the greater. Its internal border, which up to this period is ordinarily very regular, begins to become irregular, frayed, and thinned. On ophthalmoscopic examination the impression is given that the choroidal tissue of this region has given way, become frayed and torn, like the cutting of a loose coarse material.

Thus, in myopia of 5 dioptries a scleral crescent or ring is ordinarily seen, the greatest width of which measures about $1\frac{1}{2}$ millimetres, surrounded by a larger pigment crescent or ring in course of disintegration, disorganization, and more or less complete atrophy.

It should be remembered that the larger portion of the scleral crescent or ring, of the pigmentary crescent or ring, and of the consecutive choroidal atrophy, is directed upward, or outward and downward, and more rarely outward and upward.

After the peri-papillary region, the macular region is soon affected in myopia. True, it is rare to find anything in this region if the myopia is still slight, but even then the patients

almost always complain of *muscæ volitantes*. If the methods of investigation do not reveal traces of disturbance in this region, the complaints of the patients, in my opinion, are proof positive that the point in question is affected, and that there is something abnormal, since this visual region, which is extremely sensitive, produces the sensation of *muscæ volitantes* before our eyes. It is very rare to find a patient complaining of *muscæ volitantes* who has not a pigmentary crescent or ring more or less disintegrated. I have thus concluded that the hypothesis of physiological *muscæ volitantes* is a false one. It is necessary that the myopia be equal to 5 dioptries, and generally more, to find pigmentary foci, which lead little by little to choroidal atrophy in the same way as the pigmentary crescent.

To these clinical facts should be added: 1st, that the centre of the disc is about 3 millimetres within the posterior pole of the eye, and about 1 millimetre above it. In other words, its centre is about $33\frac{1}{2}$ millimetres from the temporal border of the internal periphery of the cornea, $26\frac{1}{2}$ millimetres from the nasal border, 29 millimetres from the upper border, and 31 millimetres from the lower border; 2d, that in slight degrees of myopia we do not, as a rule, find a partial peri-papillary ectasia of the eyeball, no disarrangement of the sheaths of the optic nerve, and, in general, no marked alteration of the eyeball.

Suppose, now, that we are considering an axillary myopia of 3 dioptries. This myopia is too weak to leave any doubt whatever as to the facts which I have just stated. In this myopia there is certainly no partial scleral ectasia. To have an axillary myopia of 3 dioptries, we must suppose that the posterior pole of this eye has receded about 1 millimetre.

How can this take place?

This could certainly occur if the eye became simply elongated without increasing in capacity. But we know that this senile elongation of the eye cannot take place. It is true that the possibility of this fact was believed for a long time, but now it has been demonstrated that this was a false statement. Finally,

if this had taken place the fundus of the eye would not be modified, and, consequently, the alteration which I have described about the peri-papillary and the macular region would not be found.

Neither can it be supposed that there is a distention of the posterior portion of the sclera alone, since it would be impossible for the thickest portion of the sclera to become distended without its equatorial portion, far thinner and submitted to the same pressure, also being distended.

A partial scleral ectasia of the posterior pole in a low degree of myopia is not admissible, as I have above stated.

It might also be stated that an eye, to acquire an optical axis longer by 1 millimetre and thus to become myopic 3 dioptries, has only to become more spherical, being flattened from before backward. Emmetropic or almost emmetropic eyes, which commonly become myopic if they are submitted to the proper conditions, are not flattened behind; on the contrary, their posterior portion is quite spherical. Hypermetropic eyes are generally smaller rather than flatter than emmetropic eyes. Finally, if the eye, being flattened from before backward, became myopic by first becoming spherical in its posterior segment, which would give it a longer optical axis without a change of capacity, we would not have the constant peri-papillary changes, even in low degrees of myopia.

We are thus logically led to suppose that there is a general distention of the eyeball, a distention confirmed by the ophthalmoscopic phenomena, and which is the only acceptable theory. In fact, these phenomena show us that it is necessary to have a distention of the entire sclera, when myopia develops in an eye, in order that the choroid, which is but slightly elastic, when it is drawn upon, will distend but little, and thus give way first to detachment of the border of its posterior orifice from the periphery of the papilla, and to enlargement of this orifice, an enlargement which enables us to see a larger or smaller crescent or ring of the sclera. Finally, if the disten-

tion advances, there is disintegration and progressive atrophy of this border and of other points in its extent, with disastrous visual consequences.

For this general distention of the sclera in the commencement of myopia the form, position, and direction of the scleral crescent or ring and of the ultimate choroidal atrophy are of importance. The crescentic or annular form of unequal width, the position of this crescent or of the widest portion of the ring on the external side of the disc, and the direction outward or outward and downward or upward indicate that the sclera and the choroid must stretch more in their external part, where the sclera and choroidal surface, extending from the optic disc to their external, or rather anterior, border, is more extensive, and consequently their distention is greater, according to the laws of mechanics, by which the distention will be proportional, other conditions being equal, to the surface submitted to pressure.

To gain a correct idea of these facts, it should be remembered that the centre of the disc is situated 3 millimetres inside of the posterior pole, and generally about 1 millimetre above it, and that sometimes this centre may be directly outside of or also below it. Under these conditions, it is evident that if the sclera and the choroid are submitted to an equal pressure applied on their internal surface the distention of their external portion, the papilla being taken as point of origin, will be greater, and this distention will diminish progressively toward the internal portion, which will be less distended, as the elongation is proportional, other things being equal, to the extent of surface submitted to pressure.

But as the choroid is less elastic than the sclera, it is not equally distended (1). Being attached to the sclera by a loose tissue, it does not adhere to it solidly except in the regions

(1) STRAUB: On the Equilibrium of Intra-ocular Fluids. (*Annales d'Oculistique*, Vol. CIII., p. 51.)

where it receives or sends vessels directly to the sclera, and more particularly in front around the canal of Schlemm, and behind in the macular region and around the optic disc. When obliged to follow the distention of the sclera, as it cannot equal it, on account of its lack of elasticity, it becomes detached from its peri-papillary attachment, which is weaker than that about the canal of Schlemm, while the remainder of the membrane is capable of a certain amount of gliding on the sclera, and it is thus drawn back. It is this detachment which produces a scleral crescent or ring. But if the distention progresses still further, the external border of the posterior orifice of the choroid, which is the most drawn upon, becomes loosened, frayed, and finally atrophied, as the peculiar disposition first of the pigment epithelium of the retina and then the atrophy of the choroid itself easily shows.

The choroid only sends a few scattered fibres through the optic nerve into the disc, and the orifice thus made for the entrance of the nerve, aside from these fibres, appears as though made by a punch, so that the choroidal stroma is here almost discontinuous, almost like a piece of material in which a hole has been made. On submitting to distention a round piece of loose and inelastic cloth with a diameter of 5 or 6 centimetres, approximating it, if it is desired, to the extent of the sclera, and having a circular opening about in its centre, it will be seen that the cloth will fray out where the woof is cut, consequently in its periphery and about the opening, and the edge will be ravelled and frayed at the portion which is at the greatest distance from the periphery of the cloth. This is what happens to the choroid when the sclera yields to internal pressure, but as its periphery is firmly and solidly attached, it does not give way.

This explains why the crescent, or the larger, wider portion of the scleral ring, is found on the outer side of the disc ; why its widest portion is ordinarily turned outward and downward, frequently directed outward, and sometimes outward and up-

ward; and also why the pigmentary crescent or ring and the later choroidal atrophy have an analogous disposition.

If at times there is only an external scleral crescent complicated with a pigmentary crescent or external choroidal atrophy, a condition which is most frequently complicated later with peri-papillary choroidal atrophy, it is most probably on account of greater elasticity of the sclera, or because the choroid glides more easily on the sclera.

In fact, if the sclera were still more elastic, the elasticity of the choroid being proportionally increased (1), the greater difference of extensibility of the two membranes would manifest its results in the portion where the surface exposed to extension was the greater, consequently the external portions of these membranes. Clinical facts give strong corroboration of this reason. Hypermetropia rarely becomes myopia, a fact which implies that in this case the sclera is but slightly extensible. In hypermetropia we most frequently find the scleral ring with or without a pigment ring more or less drawn out and disintegrated, and very rarely the scleral crescent with a more or less rarefied pigment crescent. Then clinical observation leads me to think that cases of myopia which develop with an external scleral crescent and external choroidal atrophy advance more rapidly and more malignantly than those of myopia developing with a scleral ring, a fact which leads to the supposition of greater extensibility of the sclera in the first case. These two concordant clinical facts are further confirmation of my theory.

If, however, the gliding of the choroid on the sclera were easier, it can be easily conceived that the internal border of its posterior orifice would retain its place, or would even extend beyond the internal papillary border, if its elasticity were the same, before reaching the limit of extension.

I should also add that sometimes the crescent in the larger

(1) If the extensibilities of the sclera and the choroid were as 8 to 2, and if 8 became 12, 2 would become 3, and the difference 6 would be 9.

portion of the scleral ring and the consecutive atrophy are found below and above, and sometimes inside ; that sometimes, also, the scleral crescent forms outside of the disc, while the atrophy of the choroid commences and advances on the internal side, as if the choroid were here more closely adherent. At other times the choroidal atrophy commences and advances from the border of the disc without the antecedent appearance of a scleral crescent or ring. Sometimes, also, there is seen an external and an internal scleral crescent, the first being larger than the second, and each followed by a staphyloma of the choroid of analogous size. Many factors enter into the disposition of all these relatively rare phenomena, but the principal rôle, in my opinion, is played by the position of the centre of the optic disc of the eye in relation to the real centre of the scleral surface.

For the general distention of the sclera and of the choroid in the commencement of myopia the following factors are therefore of importance : Quite frequently we find with the ophthalmoscope, even in low degrees of myopia, that the whole surface of the choroid has a ravelled-out appearance. It is scattered with white spots, and its pigmentation is irregular. It should not be forgotten that the choroid, because of the presence of the radiate ciliary muscle in its anterior portion and of its greater thickness forward, is more resistant in this part. Then anatomical examination ordinarily shows also, in cases of myopia of low degree, that not only is the antero-posterior axis increased, but the other diameters also. Finally, the thickness of the sclera, which is less at the equator than in front and behind, would lead to the supposition that, at least at the commencement, not only would the entire scleral surface become distended, but that the equatorial region would be the more distended.

These facts, separately and by their accord, support the opinion that in the development of myopia in an eye there is primarily a distention of the sclera followed by distention of the choroid and consecutive peri-papillary regions.

If I have discussed these facts at too great length in the desire to demonstrate this theory, it is because I attach considerable importance to them in the explanation of the pathogenesis of myopia.

This distention can be effected by no other method than by intra-ocular pressure. But this pressure must be greater than usual to produce such a result, since under other conditions it is not produced, as is shown by daily observation. On the other hand, as it has long been established that close work is the common cause of myopia, it must be supposed that in such work intra-ocular tension is increased. This is a supposition which, by reason of the facts and reasons stated, demonstrates itself, just as in the case of the pathogenesis of primary glaucoma the existence of a canal of papillary filtration and its obliteration are imposed by rigorous analysis of facts (1). The eye, however, has a greater tension during accommodation, a fact to-day well established. It remains to be seen, however, to what cause this increase of intra-ocular tension is due in near work.

In near work, in addition to the necessary accommodation, convergence of the eye plays an important rôle. In fact, it is very rare that the eye accommodates without converging, a state which exists in most one-eyed people and myopes who have renounced binocular vision.

There are observers who attribute the increase of ocular tension in near vision to pressure of the external muscles of the eye, and more particularly the external rectus, a statement which, in my opinion, is too hypothetical. The external rectus muscle in extending from behind forward follows the external orbital wall, which it only leaves to extend directly forward parallel to the optical axis. Thus the muscle is only applied to the eye from the equator to its anterior insertion—that is to say, a much smaller surface than is ordinarily supposed. In

(1) *Annales d'Oculistique*, August, 1894. Primary Glaucoma and Glaucomatous Pathogenesis.

convergence this space and the compression of the muscle on the eye should evidently increase a little, if the tendonous termination of the muscle were not there to prevent this compression of the eye in convergence. This also implies the fact that the furrow which the muscle sometimes forms on the eyeball is always smaller than that of the internal rectus (1.) In atrophies of the eyeball, when it has frequently preserved its form, but has become softer and more depressible, the furrow formed by the external rectus muscle on the anterior portion of the sclera is more superficial and weaker. I have had occasion many times to observe this fact. Also, if this muscle were applied to and compressed the eyeball to an appreciable extent in convergence, the external portion of the sclera, being better supported, would be less liable to distention than the internal portion. But we have seen that facts show a greater distention of the external portion of the sclera.

The internal rectus would have much less effect in compressing the eye in convergence, since it is unrolled, so to speak, and much less closely applied to it.

The superior and inferior recti could scarcely be suspected of exercising compression on the eye in convergence.

It seems also scarcely probable that the superior and inferior oblique could exercise an appreciable compression on the eye in convergence. The action of the superior oblique as a depressor of the eye is so facilitated in convergence that it has only to exert a relatively weak contraction to bring about this result. Also, in convergence its surface of application to the eye is considerably diminished, and renders the idea of pressure on the eyeball still less plausible. It would rather be the inferior oblique which would compress the eye in convergence. In fact, this muscle would seem to be so placed as to exercise appreciable pressure on the eye in convergence, but if this really took place distention of the sclera and the choroid below would then be prevented, a thing which does not occur.

(1) SAPPY : *Traité d'anatomie descriptive*, Vol. III.

It is true that we cannot reject all external compression of the eyeball during contraction of these muscles, but this compression would not be appreciable, because in the distention which takes place in the ocular membranes in the development of myopia in an eye the extension takes place proportionately over the scleral surface, an occurrence which would not be easy if any single one of the muscles compressed the eye in convergence. If the external muscles of the eye exerted a considerable compression in their contraction a deformation of the eye would be inevitable, and consequently a perturbation of its physiological function. These statements are therefore inadmissible. It is true that sometimes—rarely—the eyeball exists as a knob between the muscles, but this is not due, as might be supposed, to muscular pressure, but rather to distention of the eyeball itself, which is not arrested where it encounters resistance in the bands of the ocular muscles. This point of view weakens the possibility of marked compression of the eye by the contracted muscles.

There are cases in which myopia develops without the existence of convergence, as in one-eyed people and myopes who at an early age have renounced binocular vision. On the other hand, it will be seen that cases of internal strabismus are rarely accompanied by myopia.

For all these reasons, it seems certain to me that the increase of ocular tension in near vision is due exclusively to accommodation, although I cannot clearly conceive how this takes place. I prefer to admit the fact and to acknowledge my ignorance of its causes than to accept a reason which is not a reason.

I know the objection may be made that, if internal pressure stretches the ocular membranes, it should first and principally produce excavation of the disc, as occurs in glaucoma. I have observed elsewhere (1) that glaucomatous excavation in primary

(1) *Annales d'Oculistique*, 1894, Vol. CXII., p. 92.

glaucoma is due principally to glaucomatous papillitis, which probably produces softening of the connective tissue framework of the disc. In secondary glaucoma of adults and old people, where the sclera is only slightly dilated, the lamina cribrosa yields, and we have an excavation of the disc, but in primary and secondary glaucoma of infancy and youth the excavation does not occur alone without distention of the ocular membrane. In secondary glaucoma it sometimes does not occur at all, or only at a later stage, a fact which shows that in adult and old age the sclera becomes less distensible and the lamina cribrosa is relatively weaker. In childhood and youth, on the contrary, where the sclera is in a certain degree extensible, its extensibility is greater than that of the lamina cribrosa. This result follows from the facts stated, and is also in accord with the phenomena found in the development of myopia. I should also say that it not only has an evident confirmation, but also that these same phenomena would serve, if necessary, to prove it, since whatever be the mechanism which is adopted to explain the elongation of the optical axis, it is impossible, in my opinion, to deny that increase of intra-ocular tension plays the principal rôle. This over-extension, which leads to distention of the ocular membrane, does not produce excavation of the disc in myopia. Clinical facts also prove that astigmatism is generally less frequent and of a less degree in myopia than in hypermetropia, and this is also due, very probably, to this over-extension and distention of the ocular membranes, which tend to give a spherical shape to the eye.

In drawing a conclusion from what I have so far stated, I should say that it is necessary to acknowledge that the development of a myopia in an eye commences with distention of the ocular membranes, and that this distention is produced by the pressure which the ocular tension, increased by accommodation, exercises on the walls of the eyeballs.

We have seen that when the sclera is distended the choroid, not being able to follow it, on account of its weaker elasticity, is first detached from the border of the disc, then becomes

ravelled out, rarefied, and finally atrophied, to give place to the formation of a posterior staphyloma.

But to reach this result another very important element exists in addition to the tearing away of the temporal border of the papillary orifice of the choroid. In fact, the inflammatory process, in addition to the fact that it attacks the ravelled-out portions and causes them to atrophy, does not seem to develop without influencing the adjacent portion of the sclera, since it is just here that the scleral excavation commences; it is this portion of the sclera which yields first to internal pressure. The relation of cause and effect seems to me to be quite evident. Just exactly what influence this atrophic process has on the sclera it is not possible to say, but there is evidently a softening and weakening of this portion of the sclera brought about by this process, which precedes the local scleral ectasia. Analogous facts are observed in anterior irido-choroiditis, where we see the sclera undergoing distention, frequently under normal tension of the eye, and we then have intercallary and ciliary staphylomas. But it should be stated that a posterior staphyloma is not ordinarily exactly like other scleral staphylomas. Arlt (1) very properly remarks that it resembles rather a keratoconus in form and development. But the pathogenesis of the latter is unfortunately not understood.

But if there are cases of choroiditis leading to scleral ectasias, there are others which do not produce them. Such cases are seen daily. To what should this difference be ascribed? Should it be attributed, other things being equal, to a different process, or to a different degree of softening in the two cases? It cannot, I think, be precisely stated, but it is quite certain that if, as soon as a certain amount of choroidal atrophy has developed, the patient be submitted to prolonged efforts of accommodation, the scleral ectasia will not be produced, or will be arrested. This goes to show that the process in myopic choroiditis is not the same as that in anterior choroiditis.

(1) *Ibid.*

It will thus be seen that for the production of myopia increase of intra-ocular tension is indispensable.

But, on the other hand, it may be seen that this accommodative hypertension does not always lead to myopia, since we observe that a hypermetrope, although forced to make a greater effort of accommodation, and thus to bring about a greater hypertension, rarely becomes myopic. Then, if the hypermetropia is slight, another factor seems to be necessary, and this factor must be sought in greater elasticity of the sclera.

In fact, the hypermetropic eye makes greater efforts of accommodation, and it frequently happens that exactly the same initial phenomena appear as in commencing myopia, a scleral crescent or ring, with a pigment crescent or ring and frequently more or less advanced choroidal atrophy, all sure indications that the eye is undergoing a certain degree of distention. But when the elasticity reaches the limit of extension, the distention is arrested, the peri-papillary process and its consequences are prevented, and the posterior scleral ectasia and elongation of the optical axis are definitely avoided. The hypermetropic eye thus approaches emmetropia in the elongation of its optical axis, produced by distention of its membranes; sometimes it becomes emmetropic, and more rarely myopic; it is then ordinarily a low degree of myopia, since the weak extensibility of its membranes does not allow of sufficient distention to produce myopia. It is these cases of myopia which ordinarily remain stationary, but the majority of cases of myopia are progressive. In fact, clinically speaking, there are not typical, atypical, or progressive myopias—all are progressive, one more or less than another; there are degrees, but not different types. The fact that one case of myopia is more progressive than another depends frequently upon several causes, which fortunately do not always concur.

The simple fact that an eye is emmetropic is a sufficient indication that the sclera is capable of greater extension, and that it is more extensible than a hypermetropic eye; otherwise, the eye would remain in a condition of hypermetropic refraction.

Accommodation seems to be endowed by nature to supply defects of precision, and to conduct the eye, if possible, to a condition most suitable for its function. It generally accomplishes its work, but frequently its services are abused.

This greater elasticity of the choroid does not exist in a single point of the sclera, the posterior pole, as might be supposed. The latter is no more elastic than the rest of the sclera, but it is more exposed to attack in myopia because of the atrophic choroiditis which is localized in that position.

In fact, the posterior pole is only about 3 millimetres outside of the disc in the region where the choroidal atrophy exists, and it will thus be easily understood why the scleral ectasia occurs just there, and how the elongation of the optical axis is the necessary and natural result of it.

It is this localization of the atrophic process of a perfectly mechanical form which brings it about that after this process has developed to a certain extent, sufficient to soften this region, however slightly, the eye becomes distended here rather than elsewhere, and tends to assume an ovoid form by pushing this portion backward.

But if this choroidal atrophy gives the first impulse to the scleral ectasia, there is ultimately a vicious circle established in which the two elements go hand-in-hand.

The great observer and investigator, Ed. Jaeger, states (1) that sometimes the summit of the ectasia coincides with the optic disc, and that sometimes it is found inside of it. This fact is capable of disconcerting many theories advanced to explain the pathogenesis of myopia, but it does not injure mine, since the optic disc may coincide with the centre of the scleral surface, or may even fall outside of it, and the recti muscles may in rare cases exercise greater compression on the eye, and thus maintain the wall of the eyeball on their side.

From the scleral distention surpassing certain limits comes

(1) *Einstellung des dioptr. Apparates*, Wien, 1861.

also detachment of the external sheath of the optic nerve. It is naturally detached on all sides in proportion always to the distention exerted on the neighboring portions of the sclera. This is another proof that the entire surface of the sclera is distended according to the mechanical laws of the elongation of elastic tissues. It also seems very probable that this proportional distention takes place up to a very advanced degree of myopia, since from anatomical facts the sheath is strongly detached on the internal side, and supposing that the scleral ectasia has commenced, all other extension of the ocular membranes has ceased. The atrophy of the choroid surrounding the entire disc, while increasing in extent with the progress of the myopia, furnishes still another proof.

This detachment, however, in spite of the fact that many observers have considered it the origin of myopia, does not seem to contribute to any extent to its development, even when the myopia develops toward the higher degrees, since the sclerectomy, according to Jaeger (1), is not always in relation with the detachment of the sheath. The sclera distends always regularly, but choroidal atrophy and scleral ectasia are only established by preference in the part where the distention is the greatest. Furthermore, it is not the thickness of the sclera which determines the scleral ectasia, since then we would have equatorial and not postero-scleral ectasias—that is to say, at the point where the sclera is thinnest. But staphylomas in myopia are only rarely met with at this point.

After choroidal atrophy of the papillary region and that of the macular region in myopia of high degree comes atrophy of the periphery of the choroid. The macular region is affected at an earlier stage, since, being closely attached to the sclera, it is not detached in the gliding process that the choroid undergoes, without effect on its stroma. The periphery of the choroid glides more easily, but it is thicker, and it is necessary

(1) *Ibid.*

to have a stronger distention of the choroid in order to bring about disintegration and atrophy.

The optic nerve seems to be drawn outward by reason of the gliding of the choroid and its retro-bulbar folding, which is occasioned by the elongation backward of the eyeball itself.

The distention of the ciliary muscle and partial destruction of its circular portion, an increase in the radius of the cornea in high degrees of myopia, according to Donders (1), and dilatation of the pupil in myopia, are probably due, in part, to the distention of the ocular membranes. The dilatation of the pupil finds a more satisfactory explanation in the supposition that, by reason of the synergia of the ciliary muscle and of the sphincter of the iris, the less the ciliary muscle functionates the less the pupil contracts.

The myopia is ordinarily arrested at from twenty to twenty-five years, when the organism has accomplished its development, and has lost, so to speak, its tendency to growth as well as its elasticity.

I do not propose to discuss further the symptomatology of myopia in order to prove the perfect accord of the pathogenesis with the clinical symptoms of the disease, but I beg to be permitted to give a short analysis of the theories proposed in explanation of the pathogenesis of myopia, in order to show that their insufficiency is of service to the opinion which I have stated.

The theory of convergence which supposes that it is the external muscles which, by compressing the eyeball in convergence, increase the ocular hernia, and in this way produce distention of the posterior pole, is inadmissible, for the reasons stated above.

The supposition of Stilling (1), that in convergence the superior oblique exerts traction on the region of the posterior pole, and thus produces a scleral ectasia, is too hypothetical.

(1) L. DE WECKER : *Traité des maladies des yeux*, 2d ed., Vol. II.

This traction would be exerted on a portion of the sclera comprised between the posterior insertion of the two oblique muscles, and consequently we would find the first manifestations of myopia 8 to 10 millimetres outside of the optic disc and 4 millimetres above it, since the inferior oblique is inserted 4 or 5 millimetres outside of the optic nerve at or nearly at the periphery of the horizontal plane of the eye, and the middle of the tendon is 10 millimetres away from the optic nerve, while the superior oblique is inserted 8 or 10 millimetres above this, and has the same direction. But we know that this never happens, and that the first myopic manifestations always appear around the disc.

The theory of muscular insufficiency cannot be granted, since this insufficiency is not constant, but far from it, and because it always makes its appearance when there is a greater or less degree of pre-existing myopia. It is not, then, the cause, but it is none the less true that when it appears it contributes to the increase, of myopia by the stimulation given to accommodation in near vision. This insufficiency rather originates from the myopia, which frequently renders accommodation useless, and hence paralyzes the activity of the internal rectus. It is not, properly speaking, an insufficiency, but a sympathetic paresis.

Accommodation, also, simply by the traction that it exerts on the choroid, cannot produce myopia, since the gliding of the choroid on the sclera does not extend to the posterior pole. Also, if this were the case, the scleral crescent and its sequelæ would appear principally on the internal side of the disc. But such is not the case.

The idea of choroiditis or sclero-choroiditis taking the lead in the group of myopic phenomena is founded on no clinical or anatomical fact. The myopia commonly commences—I might say always—with no pre-existing trace of posterior choroiditis.

(1) Untersuchungen über die Entstehung der Kurzsichtigkeit, 1887.

Cases in which the myopia develops as the result of a low degree of hypermetropia with a scleral ring and commencing atrophy do not weaken my proposition. This is only a myopia commencing and developing in a simple hypermetropic eye. If secondary atrophy of the choroid of purely mechanical origin is produced by an inflammation or other process which attacks the disintegrated portion of the choroid, I do not know it any more than I know just what is the inflammation or what are its limits. It is, however, certain that this process, whatever be its nature, only appears at a later stage in the progress of myopia.

The theory of von Ammon (1), which states that by a special and congenital disposition of the sclera at the posterior pole the sclera becomes weaker and consequently more extensible, is not confirmed by later investigations. On the contrary, this portion of the sclera is thicker and more solid. Furthermore, as we have seen, it is not a single portion of the sclera which is distended to produce a low degree of myopia, but the entire scleral surface. So that, if this theory were true, this local distention of the sclera would only be one of the secondary causes, and not the primary and essential cause.

The theory of a spasm of accommodation acting as cause of myopia, whatever be the relation of facts, cannot be maintained, since this spasm is not always present at the commencement of the myopia, but is generally lacking. Finally, it is no more frequent in myopia than in other ametropias.

The theory of Landolt (2), that the posterior pole should first yield to internal pressure, because it presents the greater surface in the smaller space, is certainly very ingenious, and would be of some importance if the eyeball were ovoid or ellipsoid before becoming myopic. But this does not take place.

Von Arlt's (3) theory, that the posterior pole is more easily

(1) *Annales d'Oculistique*, 1859, Vol. XLII.

(2) *Archives d'ophthal.*, 1884.

(3) *Ibid.*

distended by reason of a passive hyperæmia which occurs at the posterior pole during convergence, from compression exerted on the vessels by the external rectus and inferior oblique muscles, is too hypothetical. We do not know whether this takes place, since we have no proof and no indication of it. But if it were so we would have a local manifestation of choroiditis much further outside of the disc, before and especially when the eye became myopic. This does not occur. Von Arlt himself has not indicated the relation of these facts to the first or second manifestations of myopia about the disc.

The occurrence described by von Ammon (1), von Jaeger (2), and others, of detachment of the external sheath of the optic nerve in myopia, has given rise to many theories, some more hypothetical than others. All these theories endeavor to explain the mode of formation of this detachment, which, according to the authors of these theories, is sufficient in itself to cause the development of myopia. De Hasner supposes that the optic nerve is relatively short and is submitted to strong traction on the external border of the scleral attachment during convergence. Emmert thinks that it is the external rectus, which, by compressing the optic nerve in convergence, will detach the external sheath outward, but the sheath is detached on all sides, and not solely on the external side, as he states. In accepting these suppositions and other similar ones no good result can be obtained, since detachment of the sheath only takes place in high degrees of myopia, or at least moderate degrees, and scarcely ever in myopia of low degree. It is not, therefore, a cause.

Such are the principal theories which have been brought forward to explain the pathogenesis of myopia.

“One circumstance, however,” says Landolt (3), “strikes

(1) *Arch. für. ophthal.*, Vol. IV., 1.

(2) *Ibid.*

(3) *Ibid.*

our attention—namely, that the more probable of the hypotheses mentioned, although severely criticised, have not been overthrown, and have remained in the face of the adversaries drawn up against them. This circumstance seems to me to prove that these hypotheses have some degree of truth.” In my opinion, this circumstance merely proves the insufficiency of all these veritable hypotheses, each one of which saves the other simply by its insufficiency.

Two factors are, then, necessary to produce myopia: a greater elasticity of the sclera and an increase in the ocular tension. These two factors must exist and act simultaneously, since one without the other is not sufficient. Clinical facts give us definite proof of this by teaching us that hypermetropes do not become myopes, and that only those who perform near work become myopic.

It therefore goes without saying that whatever contributes to diminish the resistance of the sclera, as severe morbid conditions, and in general all the causes of debility, and to increase the efforts of accommodation, contributes also to the development of myopia.

It therefore follows, that to prevent myopia, both, or at least one, of these factors must be eliminated. Under present social conditions it is absolutely impossible to completely avoid both or even one of these factors, and it only remains for us to endeavor to diminish their force and reduce their harmful action.

It will be noticed that children in large cities, the conditions being the same as in small towns and in the country, become more easily myopic than the youth in the latter districts. But what particularly distinguishes life in the country and in small towns from that in the large cities is that it is passed under better hygienic conditions and in the midst of purer air.

On the other hand, the education of youth—not to speak of near work which produces myopia—has in my opinion much to be desired. The road to learning is too greatly encumbered; it might be simplified with a tremendous advantage to the health and the intellectual development of the student. To

learn only what is necessary, at the proper time and in the proper manner, is not well understood.

This fact should not be forgotten when we ask how myopia may be prevented.

SUB-CONJUNCTIVAL INJECTIONS OF SUBLIMATE IN MYOPIA WITH LESIONS OF THE DEEP MEMBRANES OF THE EYE

By Dr. **de BOURGON**,

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One of the ocular affections which most frequently baffle us is without doubt myopia accompanied with extensive posterior sclero-choroiditis, or foci of macular chorio-retinitis with or without disturbances of the vitreous. Hence the recent investigations and numerous efforts to restore visual acuity in cases of pathological myopia by the use of new methods of therapeutics, which are either extraction of the lens or the use of sub-conjunctival injections of sublimate.

It is only the latter question which I propose to discuss in this article, founded upon six clinical observations followed for a sufficiently long time to offer what seems to me to be reliable information.

In the discussion concerning his communication to the Ophthalmological Society of Paris, on March 8, 1892, Dr. Darier (1) spoke very highly of the good effects of sub-conjunctival injections of sublimate in macular choroiditis, but he was far more explicit in his communication to the Congress of the French Ophthalmological Society, at Paris, in May, 1892.

(1) DARIER: Sub-conjunctival Injections of Sublimate in Inflammatory Processes of the Optic Nerve, March, 1892.

He says, in effect (1), that "in cases of macular choroiditis treated in the beginning, if the lesions are not too profound, one may obtain either *restitutio ad integrum*, or simply an improvement in vision, according to whether the changes are of syphilitic, rheumatic, or other origin; even in the choroidal alterations of myopia, sub-conjunctival injections have proved very efficacious."

One month later, Dr. Abadie (2), well prepared to judge on this subject, gave an opinion on the action of sub-conjunctival injections of sublimate in myopia complicated with chronic lesions of the deep membranes, and stated that if the injections in a myope produced no improvement, it was because the chorio-retinitis was simply myopic. Thus, there would be the elements of a differential diagnosis in the therapeutic action of sub-conjunctival injections of sublimate.

But by the side of this carefully expressed opinion we must also, in this investigation, consider that of Dr. Venneman (3), who states that in chorio-retinitis, whatever be the cause, he has used sub-conjunctival injections of sublimate with advantage.

Professor Pflueger (4) has observed the case of a woman fifty years old with a high degree of myopia (9 D.) and opacities in the vitreous who was influenced in the most satisfactory way by the injections.

With still greater enthusiasm, Dr. Gepner (5) declares himself highly satisfied with this new method of treatment in cases of myopia with changes in the fundus of the eye and ultimate diminution of vision. This pathological condition is, in his opinion, an indication for the employment of sub-conjunctival injections of sublimate.

(1) DARIER: Certain Forms of Choroiditis and Their Treatment by Sub-conjunctival Injections of Sublimate. (*Annales d'Oculistique*, Vol. CXII., p. 374.)

(2) Sub-conjunctival Injections in Ocular Therapeutics. (Results of investigations made by a number of ophthalmologists in all countries.) (*Annales d'Oculistique*, August, 1893, p. 148.)

(3) *Ibid.*, p. 149.

(4) *Ibid.*, p. 155.

(5) GEPNER: Sub-conjunctival Injections of Sublimate. (*Medycyna*, 1893.)

Without having obtained quite as brilliant results as Gepner, Professor Deutschmann (1) finds that this method of medication is useful in the choroidal lesions of myopia.

In quite a recent article by Dr. Matarangas (2), the author, without communicating a new case of myopic lesions of the deep membranes treated by sub-conjunctival injections of sublimate, in an article entitled "Choroiditis and Retinitis," writes that "in all acute cases, or in those with a new attack, the treatment is indicated," and further on in the same paragraph, "in very old cases, it should always be tried, for lesions which seemed indelible have sometimes been seen to disappear." These conditions are identical, if not in form, at least in principle, to those given by Dr. Darier (3) in a recent article. Finally, Dr. Rumszewicz (4) gives as indication for the use of sub-conjunctival injections of sublimate cases of choroiditis and retinitis in myopes. It is as a sequel to these various articles that I have decided to publish the following cases:

Case I.—D——, Joseph, twenty years old, a locksmith, came to consult me at the Saint-Joseph Hospital on December 7, 1893.

He stated that his vision had always been poor. At present it is:

OD, V = $\frac{3}{16}$ with — 20 D.

OS, V = $\frac{3}{18}$ with — 20 D.

Examined with the ophthalmoscope, after oblique illumination showing complete integrity of the cornea, of the anterior chamber, and of the anterior surfaces of the iris and the lens, the vitreous was found to be transparent. In both eyes there was a posterior temporal staphyloma with decided tortuosity of the nasal vessels and traction of the temporal vessels. The choroidal vessels persisted throughout the posterior staphyloma. Independent of this, there were plaques

(1) DEUTSCHMANN: On the Treatment of Infectious Ocular Processes by Means of Sub-conjunctival Injections of Sublimate, with General Considerations of This Method of Therapeutics. (*Beitr. zur Augst.*, September, 1894.)

MATARANGAS: Sub-conjunctival Injections of Sublimate in Ocular Therapeutics. (*Paris Thesis*, No. 11, November, 1894.)

(3) DARIER: Further Considerations of Sub-conjunctival Injections; Practical Theory; Indications; Contra-indications. (*Annales d'Oculistique*, Vol. CXII, pp. 391 and 392.)

(4) RUMSZEWICZ: The Therapeutic Value of Sub-conjunctival Injections of Sublimate. (*Pizegl. Lek.*, 4-5.)

of disseminated choroiditis near the posterior pole of the eye and principally in the macular region.

From this combination of symptoms, it was clear that I was dealing with a *congenital myopia with choroidal lesions*.

On interrogation, the patient stated that his vision had always been poor, that it had diminished up to the age of sixteen years, and that since that time it had remained stationary. His general health was good, but it should be stated that he had sclerosing otitis.

I prescribed complete rest from all work, a weak solution of iodide of potassium internally, and spoke to him of a possible operation (I then thought of extraction of the lens), recommending him to return in a month.

At the end of a month the patient was again examined, and presented the same visual acuity, but he had not fulfilled my orders, at least completely. A laborer, he was forced to work for his living, and was compelled to do very fine work.

Considering extraction of the normal lens as an operation which might be followed by severe consequences, I decided to submit this patient to sub-conjunctival injections of sublimate, in spite of Dr. Abadie's reserve formula. In any case, I could do no harm.

I commenced, then, by injecting twice a week one or two drops of a 1 to $\frac{1}{1000}$ solution of sublimate under the conjunctiva, with all the necessary aseptic precautions.

During the entire treatment he experienced neither pain, œdema of the conjunctiva, nor sub-conjunctival ecchymosis.

From the 17th of January to the 21st of February the man continued to work, and I made fifteen sub-conjunctival injections. I then examined his vision, which was :

OD, V = $\frac{3}{10}$ with — 20 D.

OS, V = $\frac{3}{10}$ with — 20 D.

As, according to Dr. Darier (1), it is generally of no avail to continue treatment if after ten sub-conjunctival injections no result has been obtained, I suspended the sub-conjunctival injections with this patient, for it is only in cases where one is encouraged by the results obtained (2) that fifty or sixty sub-conjunctival injections should be performed.

Case II.—P——, Armandine, ten and a half years old, a school-

(1) DARIER: Sub-conjunctival Injections of Sublimate. (*Annales d'Oculistique*, April, 1893, p. 252.)

(2) DARIER. (*Loc. cit.*, p. 252.)

girl, came to the Saint-Joseph Hospital April 10, 1894, accompanied by her mother, who requested glasses for her daughter.

She had a mean myopia of 6 dioptries. Her vision was $\frac{3}{8}$ in the right eye and $\frac{3}{16}$ in the left.

On ophthalmoscopic examination numerous flocculi were found in the vitreous. The discs were oval, and had a very marked posterior temporal staphyloma with traction of the vessels.

No disseminated choroiditis. No macular atrophy.

I prescribed rest, iodide of potassium in small doses, internally, and peri-orbital mercurial inunctions every evening for fifteen days.

The treatment was not well carried out, and when she returned, May 23, 1894, she had :

OD, V = $\frac{3}{8}$ with — 6 D.

OS, V = $\frac{3}{16}$ with — 6 D.

That is to say, stationary vision. I then commenced to perform sub-conjunctival injections with 1 to $\frac{1}{1000}$ sublimate twice a week up to twelve injections for each eye. On the fifth puncture the right eye was affected with very extensive sub-conjunctival ecchymosis, which required fifteen days for complete reabsorption. On the other hand, each puncture was followed by painful phenomena, but I paid no attention to the slight complication which had been mentioned by Dr. Darier (1).

July 11, 1894, four days after the last puncture, vision had remained stationary.

The patient was seen again without treatment December 12, 1894, and the visual acuity remained the same. During the entire period of treatment she had continued to go to school.

Case III.—Mme. Emilie L——, forty-five years old, no profession, came to my office for consultation April 12, 1894.

She stated that she had been myopic from infancy, and was obliged to bring her book or her embroidery nearer and nearer to her eyes.

OD, V = $\frac{1}{2}$ with — 11 D.

OS, V = $\frac{1}{2}$ with — 12 D.

On ophthalmoscopic examination it was found that the media were intact, but there was posterior sclero-choroiditis in both eyes and a plaque of atrophic choroiditis in the region of the macula in the left eye.

I proposed sub-conjunctival injections of sublimate to the patient, and prescribed glasses of — 11 D. for distant vision and — 7 D. for near vision, recommending her, however, only to use them in case of

(1) DARIER. (*Loc. cit.*, pp. 252 and 253.)

necessity, a recommendation which was not carried out, as the patient was very fond of reading.

From April 12, 1894, to May 9, 1894, I performed a sub-conjunctival injection of 1 to $\frac{1}{1000}$ sublimate every two days in both eyes, about ten injections in each eye.

Vision, as examined May 9, 1894, was :

OD, V = $\frac{1}{10}$ with — 11 D.

OS, V = $\frac{1}{8}$ with — 12 D.

Case IV.—Elvire J——, thirty-one years old, laundress, came to the Saint-Joseph Hospital for consultation November 28, 1894.

Vision was :

OD, V = $\frac{1}{10}$ with — 7 D.

OS, V = $\frac{1}{10}$ with — 16 D.

She had an internal squint of the right eye which, she said, had existed from birth.

The ophthalmoscope revealed the presence of opacities in the vitreous joined with extensive posterior sclero-choroiditis. In both eyes there was a large scleral ectasia around the disc which was more pronounced in the external than in the internal region. The temporal vessels were very markedly drawn, and the nasal vessels were looped. The macular region was atrophied and surrounded by a halo of pigment. There were also several plaques of disseminated choroiditis, principally in the atrophic period in the left eye. The arteries of the disc and of the retina were reduced in size.

The patient had always been myopic. Six months before, my colleague in the Saint-Joseph Hospital, Dr. Le Bec, had performed a hysterectomy on her, and she had not perceived any change in vision as a result of the operation. It was only three months ago that she noticed a disturbance in vision. It seemed as though there were a continual haze before the eyes. This haze was explained on objective examination, which showed that there were disturbances in the vitreous. It seemed, then, that there was an acute attack in the course of a chronic affection, and it is proper to carefully consider this important point when I shall return to the general considerations which naturally follow from these observations.

I immediately proposed treatment by sub-conjunctival injections of sublimate, and I performed ten injections in twenty-five days without recommending rest or any other medication.

December 29, 1894, vision was :

OD, V = $\frac{1}{10}$ with — 7 D.

OS, V = $\frac{1}{10}$ with 16 D.

Ophthalmoscopic examination showed a stationary condition of the affection. The opacities in the vitreous still remained.

Case V.—December 27, 1894, M. P——, a wine merchant, fifty-four years old, came to my office for consultation.

He had always been myopic, he said, but for more than fifteen days his myopia seemed to have increased. He attributed this diminution of vision to the excessive work of the end of the year.

His vision was :

OD, $V = \frac{1}{10}$ with — 16 D.

OS, $V = \frac{1}{8}$ with 14 D.

Ophthalmoscopic examination showed that there was a very extensive posterior temporal staphyloma in both eyes. This staphyloma was surrounded by irregular plaques of choroiditis. In certain parts of the posterior pole there were numerous deposits of pigment. The retinal vessels were very thin. There were floating bodies in the vitreous. Not to attribute this sudden diminution in vision to these multiple lesions, a diminution which might have been caused by toxic amblyopia, a natural supposition considering the patient's profession, I carefully examined his visual field and his perception of color. The absence of the central scotoma, the integrity of the periphery of the visual field, caused me to reject the idea of a lesion of the optic nerve and to accept the diagnosis of progressive myopia with lesions of the deep membranes of the eye.

The patient was given sub-conjunctival injections of sublimate, twenty drops in both eyes, three times a week.

From December 27, 1894, to February 2, 1895, I gave him twelve sub-conjunctival injections in each eye.

He had continued to work during this entire period.

February 2, 1895, vision was :

OD, $V = \frac{1}{10}$ with 16 D.

OS, $V = \frac{1}{8}$ with 14 D.

Far from improving, the patient's condition was then aggravated. I was then forced to interrupt this treatment and prescribe absolute rest, combined with the internal use of iodide of potassium in small dose, etc.

Case VI.—D——, Jeanne, nineteen years old, no profession, who had been in the hospital of the Blind Sisters of Saint Paul, was brought to the Saint-Joseph Hospital December 29, 1894.

She had a high degree of myopia, but the lesions of the deep membrane were present in maximum intensity.

The entire posterior pole of the eye formed one ectasia, and was scattered with plaques of atrophic choroiditis. The macular region

was principally affected on the left side. The retinal vessels were greatly atrophied. The vitreous was transparent. The eyeballs were markedly projecting, giving at first view the appearance of exophthalmic goitre.

In childhood she had had an iridectomy in both eyes.

Her vision was very poor.

OD : Counted fingers at 2.50 m. with — 10 D.

OS : With — 10 D. could not count fingers at any distance, but simply distinguished light from darkness.

I immediately instituted treatment with sub-conjunctival injections of sublimate every three days in both eyes.

February 6, 1895, the patient had had ten sub-conjunctival injections in each eye, and had experienced some local pain, lasting at times for twenty-four hours.

Vision was the same as that found December 29, 1894; however, the patient was satisfied. She stated that the cloud before the eyes was not as intense, and that she saw fingers sharply at 2.50 m. with — 10 D., instead of seeing them indistinctly, as she had done six weeks before.

I should state that in the six preceding cases it was not possible to find a syphilitic history in any of the patients.

If now we examine these cases together, it will be seen that they may be divided into two groups from the point of view of the lesions :

1st. Myopia of high degree with transparent vitreous (Cases I., III., and VI.).

2d. Myopia of high degree with opacity of the vitreous (Cases II., IV., and V.).

In regard to its progress in four cases (Cases I., II., III., and VI.), the myopia advanced progressively without acute attack; in two cases (Cases IV. and V.) the myopia increased very rapidly. In all the cases the myopia was congenital. As a therapeutic result, the sub-conjunctival injections produced no improvement in the first five cases. In Case VI., only, we see that the patient stated that she did not see so great a haze.

Finally, it should be carefully noted that all these patients underwent treatment *without ocular rest*.

The first fact which follows from these cases is that the dis-

turbance of the vitreous, so amenable to sub-conjunctival injections of sublimate in cases of chorio-retinitis, irido-choroiditis, etc., according to some authors, are not improved when the disturbances are of myopic origin. Cases II., IV., and V. were absolutely unsuccessful from this point of view.

A second conclusion is that the acute attacks, as may be seen from Cases IV. and V., are but little, if at all, modified by the use of this method of treatment. In any case the rapid increase of myopia is not, clinically speaking, an indication for the use of sub-conjunctival injections.

In conclusion, then, and without denying that when a foreign element is added to pre-existing myopic lesions the use of sub-conjunctival injections of sublimate will produce a favorable modification in the morbid process, it may be stated that pathological myopia should only be treated in this way in exceptional cases, and that success is but rarely obtained in practice, if sub-conjunctival injections of sublimate are employed and nothing else.

Passing over all cases which do not enter this class, and considering only those of high degrees of myopia with lesions of the deep ocular membranes of old origin, stationary or increasing, either slowly or rapidly, in my opinion the success obtained is due to the fact that concurrent with the sub-conjunctival injections of sublimate ocular rest was prescribed. In the cases which I have described in detail, I followed Dr. Darier's method of treatment most rigorously, and yet I have noted no improvement in any one of my patients, because I allowed them to continue to perform their ordinary or favorite occupations.

And on this point I agree with Mutermilch (1), who, in an article written under the direction of Dr. L. Kramsztyk (Warsaw), states that a grave error has been committed in attributing the success of the treatment of myopic choroiditis to injections, "forgetting the conditions under which the patient was

(1) MUTERMILCH: Critical Remarks on the Subject of Sub-conjunctival Injections of Sublimate. *Annales d'Oculistique*, Vol. CXII., p. 171, September, 1894.

kept, and neglecting for the moment the factor with the most powerful influence on the progress of the disease: I mean rest for the eye."

ORBITAL PHLEGMON; COMPLICATION OF INFLUENZA

By Dr. **Ed. PERGENS** (Brussels).

Although epidemics of influenza have been very extensive of late years, cases of tenonitis, orbital cellulitis, and orbital abscess have been quite rarely mentioned as complications in the course of the disease. Tenonitis and cellulitis have been more frequently observed; when these inflammations do not extend to suppuration they are generally treated by the physician in charge. I have had the opportunity of observing three cases of orbital abscess, two of which were fatal, and was able to make an autopsy on one of these cases. The third only came to me after recovery from the fever, with a perforation of the lachrymal sac and a fistula to the lid.

Case I.—A boy fourteen years old had been ill for six days. The disease had commenced with violent headache; extreme lassitude compelled him to remain in bed from the beginning of the attack. The general appearance of the patient was that of a person suffering from a high fever; temperature was 39.7° C., respiration 42, and pulse 136. There was quite severe prostration. Antipyrine in the dose of 1½ grammes, taken with a good dose of alcohol, caused the temperature to fall to 38.2° C. The lids were greatly swollen; the left lid was affected after the fourth day, and the right eye, five or six hours later. The entire appearance was that of a severe blennorrhœic ophthalmia; the coverings of the left eye were as thick as the fist, and those of the right eye about half this size. The conjunctival secretion was somewhat increased; microscopical examination failed to reveal gonococci; inspection of the genital organs showed no trace of gonorrhœa. The lids were very sensitive to touch. After instillation of cocaine, I succeeded in examining first the right eye. The conjunctiva was chemotic. Movements of the eyeballs were abolished (false ophthalmoplegia). The cornea was transparent,

the iris of normal color, and it reacted well to light. The patient could not stand ophthalmoscopic examination. The appearance of the left eye was the same, but motility of the eyeball was not entirely suppressed. It was very painful, and rotations were much limited. There was a divergent strabismus which had not been present before. The patient was able, with an effort, to read the characters in a journal with either eye.

I prescribed a saline purgative, and a wet pack to the lower limbs. Locally, collyrium of atropine was given, and 50 per cent. ichthyol ointment was applied to the lids. Three grammes of antipyrine and alcohol were given daily. It was impossible to see if there was protrusion of the eyeball on account of the swelling; if it existed, it was slight.

Two days later I saw the patient again. The physician in charge told me that the temperature had continued between 38.7° and 39.4° C. The lids of the right eye were diminished in size; those of the left eye were of the same size, but the upper lids had become livid, and distinct fluctuation could be felt. An exploratory puncture revealed pus. I made an incision parallel to the superciliary arch and below it. About 30 cubic centimetres of pus escaped. A sound could be deeply inserted into the orbital cavity behind the eye without encountering necrotic portions of bone or denuded bone. The pocket was irrigated with $\frac{1}{1000}$ sublimate and lightly packed with iodoform gauze. On bacteriological examination the pus was found to contain the pneumococcus of Friedländer and the staphylococcus pyogenes aureus. The right eye returned to its normal condition on the eleventh day of the disease. The twelfth day the patient died with a temperature of 41.6° C. The left eye was much improved. The eyeball had in part resumed its mobility, and the distention of the integuments had much diminished. The wound was in course of cicatrization. Autopsy was refused.

Case II.—A young man nineteen years old came to consult me on the ninth day of his disease. He was apathetic, temperature 38.4° C., respiration 36, and pulse 118. He replied with difficulty and with effort to the questions addressed to him. The physician in charge had prescribed powders of 0.25 gr. of antifebrine three times a day. The lids of the right eye were hard, tense, and greatly swollen. The upper lid of the left eye was livid, and distinct fluctuations could be felt; the lower lid was not tense. I first performed three exploratory punctures in the lids of the right eye, penetrating into the orbital cavity; the results were negative. A positive result was

obtained from the lower lid of the left eye. Cultures gave staphylococcus pyogenes albus and aureus.

The corneæ of both eyes were perfectly transparent. The conjunctiva was chemotic. The fundus of the eye was visible with the inverted image. The mobility of both eyes was almost entirely abolished. The media were transparent, and the iris reacted to light. The fundus of the right eye was normal; that of the left gave the picture of optic papillitis without impairment of vision, as the patient could read Sn. 0.5. I first performed an incision parallel to the lower lid and about 12 cubic centimetres of pus escaped. The sound penetrated behind the eyeball, and necrotic material could be felt on the ethmoid and superior maxillary bones. The swelling of the upper lid was not reduced by this incision. I packed it with iodoform gauze and made a parallel incision through the upper lid, below the superciliary arch, which produced 15 cubic centimetres of pus. The sound penetrated behind the eyeball, without encountering necrotic or denuded osseous walls. An injection of $\frac{1}{1000}$ sublimate did not pass from one abscess to another. Pus escaped through the left nostril; irrigation in the abscess was not evacuated by this channel. The cavities were lightly packed with iodoform gauze. The physician in charge told me that on the twelfth day of the disease the integuments of the right eye had revealed fluctuation, and that he had made incisions similar to those on the other side. On the thirteenth day I saw the patient again. Pus was discharged from both nostrils. There was a diffuse disturbance of the entire surface of both corneæ. The patient suffered greatly. The temperature had risen to 41.2°C ., respiration was 38, and pulse was 132. On the day following, panophthalmitis was in full course in both eyes. The temperature oscillated between 41.4° and 42.1°C . Death occurred about six o'clock. Autopsy showed purulent disintegration of both eyes. In several points of the left cornea there was superficial loss of substance; it was perforated in the lower portion, and all the layers were cloudy. The lens was still attached to the zonula by a few fibres; it was cloudy and inclined forward and downward. The iris was not adherent to it. The interior of the eye was filled with pus. The retina was detached from the choroid below and on the outer side. The ethmoidal and maxillary portions of the left orbit which corresponded to the lower abscess above mentioned were necrotic. The upper abscess did not communicate with bony tissues, and seemed to have originated from inflammation of the cellular tissue. There were no necrotic portions in the right orbit, but a large abscess extended

behind the eyeball and surrounded its superior, external, and inferior portions. The appearance of the right eye was similar to that of the left, only the opaque lens was carried further forward. The cornea was perforated in the centre, and the iris prolapsed through the wound, where it was partially adherent, while in another portion there were anterior synechiæ. The interior was also filled with pus. The retina was everywhere adherent to the choroid. In both eyes there was phlebitis of the superior and inferior ophthalmic veins, the cavernous, coronary, and petrous sinuses. Their interior was filled with blood mingled with pus. The frontal sinuses and the ethmoid cells of both sides were filled with pus; the left ethmoid bone was partially necrotic, and dark in color. The left maxillary sinus was one-third full of pus, while that of the right side was in a normal condition. Both sphenoidal sinuses were filled with pus. Both optic nerves were cedematous and bathed in the pus which occupied the entire base of the brain. The ventricles of the brain were normal. There were several small abscesses in the left frontal lobe, most of which were about 1 cubic centimetre in size. Nothing was found in the left frontal lobe.

Case III.—A girl twenty-eight years of age came to consult me two weeks after her fever had disappeared. She had been in bed for six days. On the fourth day the left eye had become greatly swollen and there had been severe pain in the orbital region. The physician in charge had prescribed cataplasms, which had given relief, but the abscess had opened in two parts, underneath the middle of the lower lid, and near the internal angle. She could read Sn. at 60 centimetres. On exploration there was found: first, a phlegmon of the lachrymal sac, then a fistulous orifice which extended from the middle of the lower lid toward the temporal side. The frontal and maxillary sinuses appeared perfectly translucent by means of Vohsen's apparatus. On the following day I curetted the sac and the fistula, which was lost about 12 millimetres deep in the cellular tissue.

Cultures revealed the presence of staphylococcus pyogenes albus and bacillus pyocyaneus. Iodoform gauze was introduced, and the orbital fistula closed in the course of the third week after intervention. Sounds were passed into the naso-lachrymal canal, first daily, and then every other day for six weeks, which brought about recovery. There was arborescent vesicular keratitis, for which I employed sub-conjunctival injections of sublimate, and later applications of yellow ointment. After two months of treatment there were still some remnants of infiltration, so that the patient could only read Sn. 1.25 at 38 centimetres.

These cases were observed while influenza was prevalent at Limbourg. Microscopical examination enables them to be differentiated, when it is necessary, from blennorrhœic infection. The affection might have been due to erysipelas, but outside of the fact that it did not extend to neighboring parts, mice which were inoculated were not attacked with erysipelas. I am unable to explain the mode of immigration of the microbes. None of the three patients had been previously affected with conjunctivitis, dacryocystitis, ozæna, or affections of the cranial cavities. The microbes found were in the first case the pneumococcus of Friedländer and the staphylococcus pyogenes aureus; in the second case, the staphylococcus albus and aureus; in the third case, the bacillus pyocyaneus and the staphylococcus pyogenes albus. Ophthalmoscopic examination could only be made once, and then it revealed a normal image on one side and optic papillitis on the other. Protuberance of the retina near the abscess, as described by Uszynski (1), was not seen. Although pus had been evacuated when puncture or fluctuation had revealed its presence, the first two cases terminated as fatally as the case described by Alt (2) in 1889, where death was the result of purulent meningitis and pus was found in the orbital cavity on autopsy, although an exploratory incision had only given a negative result. Zimmerman (3) has communicated a case of orbital cellulitis and inflammation of the mastoid cells; the cellulitis retrograded, but the mastoid cells were trephined. Borthen (4) has observed a case of orbital abscess with favorable termination.

The cases which I have described all commenced in the left eye. In the first case, death was not caused by propagation of the pus from the orbit to the meninges, since the symptoms had receded before death. In the second case, it is difficult to say whether there had been a primary affection of one of the sinuses. Taking into consideration the tension exerted by the swollen

(1) *Zehender's klin. Mon.*, 1892, p. 111.

(2) *Americ. Journ. of Ophth.*, 1889, p. 307.

(3) *Arch. of Otology*, 1892, Vol. XXI., No. 1.

(4) *Zehender's klin. Mon.*, 1891, p. 85.

skin on both abscesses, completely independent of each other, and since the solution of sublimate did not penetrate into the nasal cavities, it might be concluded that they were independent. But considering the fact that from the beginning of the ocular affection pus had escaped from the nasal cavity, that on autopsy the ethmoid was the more necrotic, and consequently, in all probability, the longest affected, it seems to me that the ethmoid cells of the left side were the first region of supuration.

The ophthalmoscopic pictures of similar cases have been observed, among others, by Lawford (1), who found venous hyperæmia of the disc in orbital abscess, and by Mellinger (2), who in two cases observed very pronounced hyperæmia; in one of these cases there was choroiditis in both eyes. The other regained normal vision.

OCULAR MANIFESTATIONS OF VANILLISM (3)

By Dr. GUÉRIN,

Physician-in-Chief of the Board of Health of the French Colonies.

By the name vanillism is understood the group of disturbances brought about by the vanilla industry, whether these disturbances are produced by ingestion of the fruit as a condiment or by the manipulations necessitated in its preparation. Hence there are two classes of vanillism: elementary vanillism and professional vanillism.

This branch of hygiene has only been known through the works of Dr. Layet. Before his writings, only a few rare cases of alimentary vanillism were found in medical literature. Dr. Layet's experiments on guinea-pigs seem to show that vanilla swallowed in too great quantities may be toxic. It is necessary, however, to take into consideration the quality of the vanilla employed, and to know that most of the disturbances

(1) *Lancet*, 1889, 2, p. 266.

(2) *Zehender's klin. Mon.*, 1887, p. 61.

(3) Extract from the *Archives de médecine navale et coloniale*.

produced should be attributed to vanillon. It is an interesting fact that in the Antilles, where an immoderate use is made of vanilla in confectionery, cases of poisoning are unknown; nevertheless, they employ choice vanilla and vanillon (1) indiscriminately, but these products are not altered by moulds or other organisms. The cases of poisoning investigated seem, then, to me, to be due rather to some alteration in the commodity than to the commodity itself, although I do not in principle deny that vanilla is toxic.

From the professional point of view, vanillism is a hydrocarburism which occurs with a symptomatology common to all its congeners. The cachexia encountered among those laborers who breathe the vapors of benzine, nitro-benzine, and terebenthine; that is seen among persons employed in the manufacture of tar; the cardiac disturbances produced by vapors of petroleum; the digestive disturbances common in the workshops where methyl alcohol is vaporized, and the nervous troubles occasioned by aldehydes and aromatic acetones, differ but little from the effects of vanillism. The action on the genital system and on the organ of vision seem alone to be characteristic of the hydrocarburism in which we are interested.

During a sojourn of several years at Guadeloupe I had occasion to observe the pathological disturbances produced by vanilla during its preparation—that is to say, in an unaltered condition. I found that the entire organism was affected by this toxic element, and that it was peculiarly prejudicial to females.

But I propose to discuss here only the ocular disturbances. Without enlarging upon the superficial lesions (erosions and excoriations of the lids, simple and ulcerative forms of conjunctivitis), which may be caused by transport, by means of soiled hands, from the corrosive oil contained in the vanilla pods, I will mention the deeper disturbances of the eye, which are far more interesting.

There is first a tension of the eyeball, a feeling of weight soon followed by deep pain with peri-orbital radiation. This

(1) An inferior kind of vanilla.

condition is soon complicated by progressive diminution of vision which may go as far as amaurosis.

Ophthalmoscopic examination shows no disturbance in the media, but the disc is always highly congested. In some patients I have seen retinitis, and consecutively, chorio-retinitis.

I have been struck, in many cases, with the analogy of the ocular symptoms of vanillism with those of simple glaucoma, except, however, the general appearance of the eye so characteristic of glaucoma. The patient complains of a feeling of weight in the eyeball, which is sensitive to pressure, and the pupil is dilated. It is not a true glaucoma, but a condition which might be called sub-glaucomatous. These disturbances disappear under the influence of antiphlogistics, alteratives, and myotics (pilocarpine rather than eserine), and especially on change of occupation.

Could not these congestive attacks on the part of the eye be considered as the predisposing cause of glaucoma, so common in Guadeloupe? Are these visual disturbances the result of vanilla poisoning, or are they dependent on pathological modifications produced in the uterus by vanillism? Berger (*Les maladies des yeux dans leurs rapports avec la pathologie générale*, Paris, 1892) acknowledges the hypothesis of a uterine cause in the genesis of certain affections of the fundus of the eye. I prefer to hold the first opinion for the case under discussion.

II.—REPORTS OF SOCIETIES

CONGRESSES

ITALIAN SOCIETY OF OPHTHALMOLOGY

Fourteenth Session, held at Venice, August 26-29, 1895.

(Report of the Proceedings by our Correspondent, Dr. PARIBOTTI.)

Stereoscopy in the Treatment of Strabismus.

DR. REYMOND (Turin).—One of the greatest difficulties opposed to the correction of strabismus is the impossibility of the patient's realizing stereoscopic vision. This difficulty does not depend on

errors of refraction, but rather on the difficulty which the two eyes must overcome to converge to the median line.

This convergence may, however, be obtained by means of stereoscopy. Most frequently six or seven attempts are sufficient.

In stereoscopy simple images are given, and as the patient is accustomed to look with only one eye to obtain binocular fusion, it will be well to alternately cover the two images. For this purpose, Dr. Reymond has had adapted to an ordinary stereoscope a revolving disc provided with two openings which come alternately before the two glasses of the instrument.

At the first sittings the disc is rotated slowly, and in successive sittings more and more rapidly. In this way the patient little by little becomes accustomed to binocular fusion.

Dr. Reymond also presented as corroboration of this communication an apparatus of Dr. Gaudenri for the purpose of examining the equilibrium of the ocular muscles.

Dr. Guaita asked Dr. Reymond what was the meaning of the expression "position of equilibrium."

Dr. Reymond.—By position of equilibrium is meant the degree of convergence of the eye in relation to the eye which is fixed. This degree of convergence is strictly synergic and proportionate to the effort of accommodation. It is, however, necessary that at the time of examination the fixing eye be exactly accommodated.

Aracetine.

DR. REYMOND, in the name of DR. LAVAGNA, presented an article on the physiological action of aracetine. Dr. Lavagna, while studying the salts of this alkaloid, has discovered that they have a very energetic myotic action of short duration. Myosis is complete in five minutes, and disappears in seventy minutes. A 1 per cent. solution was used.

Aracetine acts on the ciliary muscles, producing a spasm as intense as that caused by eserine, but this phenomenon lasts but a short time.

The author has found an anti-glaucomatous action. This medication is recommended in all cases where immediate and brief myosis is desired.

A New Method for Measuring Color Sensitiveness.

DR. GUAITA (Vienna).—The principle of this method is the well-established fact that an eye which is blind for one color perceives light of the complementary color.

The author employs an apparatus provided with three rotating

discs. These three discs are each 20 centimetres in diameter, and are composed of three sectors, each carrying one of the fundamental colors in such a proportion that on turning the disc a pure gray will be obtained. In the central part, with a disc 10 centimetres in diameter, and of the same luminous intensity as the color to be illuminated, one may cover partially or completely one of the colored sectors, in one disc red, in another the green, and in the third the violet. When the discs are rotated there is produced in the central portion the effect of partial or total absence of the corresponding fundamental color, and the defect may be measured in degree by means of a graduated circle.

If the patient is completely blind for one color, he will see the corresponding disc of a uniform tint when the colored sector is completely covered in the central portion by the gray disc. If he is but partially blind for this color, he will only notice the difference between the centre and the periphery of the corresponding disc when a portion greater than that for the normal eye is covered, and this will be the greater as the defect in the eye is greater.

The discs are supplied with the fundamental colors according to the Young-Helmholtz theory.

Asepsis of Collyria.

DR. GUAITA, in the name of DR. PAGNINI, presented a practical method for the asepsis of collyria. Boiling is inconvenient, as it must be repeated whenever the collyrium is used, and too expensive, as the collyrium must be renewed after boiling a few times. It also has the fault of altering the collyria. Several years ago Sattler advised adding sublimate to solution of cocaine to obtain asepsis. But the sublimate had to be renounced because it precipitated the alkaloids.

Dr. Pagnini has experimented with other substances with the same aim in view. Boric acid is not efficacious even in the maximum amount of solubility at ordinary temperatures. Trichlorate in proportion of $\frac{1}{1000}$ is not sufficient for the asepsis of collyria, or even $\frac{1}{100}$, and in this dose it is very irritating for the eye.

Formol, as proposed by Valude, in the proportion of $\frac{1}{1000}$, is not always powerful enough, but it is so in the proportion of $\frac{1}{100}$. Even in this dose formol causes no irritation of any consequence. It does not decompose alkaloids, and therefore Dr. Pagnini considers it as the purest method of maintaining asepsis in collyria of atropine, duboisine, scopolamine, eserine, pilocarpine, etc. Cocaine is not a

good medium for the culture of infections, and therefore boric acid is sufficient for this collyrium. Formol cannot be added to sulphate of zinc on account of chemical incompatibility. Salicylic acid in the proportion of 3 to 1,000 may be employed for this collyrium.

A Case of Amyloid Degeneration of the Cornea.

DR. E. BAQUIS (Livourne).—Published cases of amyloid degeneration of the cornea are not numerous. I only know of the one published in 1886 by Beselin.

The eye examined by Dr. Baquis had for many years been affected with a small adherent central leucoma, the result of purulent ophthalmia. In the microscopical sections the amyloid substance formed masses of various size, round in form, sometimes isolated, sometimes confluent, and located more particularly in the interlamellar lacunæ of the proper substance of the cornea. The amyloid substance, according to the author, was derived from these lamellæ, and not from the cellular elements.

Is this amyloid degeneration a phase which succeeds hyaline degeneration? This point is being much discussed to-day. The author can only say that in his case the amyloid degeneration was not preceded by hyaline degeneration. As amyloid degeneration is a protoplasmic alteration pushed to an excessive degree, it may properly be supposed that it will also attack elements already degenerated, but the necessity of this passage through hyaline degeneration to reach amyloid is far from being demonstrated.

Dr. de Vincentiis.—He cannot subscribe to the latter conclusion of Dr. Baquis. In a case which he studied he reached conclusions diametrically opposite.

Operations for Incomplete Cataract.

DR. VITALI (Bari).—The author thinks that the theory which commonly prevails of interfering with incomplete cataracts is much exaggerated. These cataracts may be successfully operated upon, on condition that irrigation of the anterior chamber is diligently performed and repeated several times. Cases which he has operated upon have terminated so successfully that he no longer thinks it is necessary to perform artificial ripening.

Dr. Gosetti.—It is quite astonishing that secondary cataracts do not occur after operations performed under these conditions. He has also tried irrigation of the anterior chamber, but has never succeeded in removing all the cortical masses, which remain even in an operation for incomplete cataract. This is furthermore the opinion

of nearly all operators on the efficacy of irrigation of the anterior chamber.

Dr. Gradenigo.—It is sometimes necessary to operate for cataracts which have not reached maturity. By the ordinary operative methods there is almost always reaction on the part of the iris and formation of secondary cataract. The best process would be extraction of the lens in its capsule.

Dr. Businelli (Rome).—This extraction *in toto* would be the *desideratum*, and possibly a better result would be obtained than by artificial ripening. I think, however, that sometimes a cataract which is not ripe may be successfully cured.

Dr. Moauro.—In cases of cataract which still have transparent cortical fibres, I find Dr. de Wecker's method of extracting the central portion of the anterior lens capsule with Förster's forceps most useful. I have seen most beautiful results in patients operated upon in this manner by my preceptor, Professor de Vincentiis, at the Naples clinic.

Dr. Guaita.—I think that the cataracts operated upon by Dr. Vitali must have been very near maturity. I approve of artificial ripening and the process of removing a portion of the anterior capsule when the cataract is not ripe.

The Operation Called Internal Sclerotomy.

DR. DE VINCENTIIS (Naples).—The speaker recurred to his operation of incision of the angle of the iris. The name internal sclerotomy has been given to the operation by other authors for the purpose of identifying it with the old sclerotomy of de Wecker, while, on the contrary, it is not a sclerotomy, and this operation has nothing in common with that of de Wecker. It is quite true that Dr. de Wecker, after seeing the operation performed by the speaker at Naples, desired to identify the two operations, but there is no justification for this professed identity, and every one now knows that the priority of the operation of incision of the angle of the iris belongs to him. The number of operations performed by him and his pupils is now about one hundred. In all these cases the author has been well satisfied, and success was lasting, so that now more than ever he believes in the utility of his operation.

Treatment of Glaucoma by Incision of the Angle of the Iris.

DR. SGROSSO (Naples).—De Vincentiis' operation has been performed by the speaker ten times for glaucoma, and the result in all cases was most satisfactory. Examination of the visual fields before

and after the operation showed a marked enlargement as the result of the operation.

Dr. Gallenga can, from his experience, confirm the results obtained by *de Vincentiis'* operation. Whenever he has performed it he has been thoroughly satisfied with the result.

Dr. Businelli thinks that it should be stated that *Dr. Sgrosso* makes a certain selection between the different forms of glaucoma, which is quite necessary, because, in some cases, in spite of every indication, it would not be possible to perform the operation proposed. He would be glad if *Dr. Sgrosso* would define the cases which are amenable to the operation.

Dr. Sgrosso.—The operation cannot be performed in cases of excessive narrowing of the anterior chamber.

Dr. Gradenigo also thinks that it is necessary to make a distinction between the different forms of glaucoma, and that the old and classical distinctions into anterior and posterior glaucoma should be retained. In which of these two forms is the greater indication for incision of the angle of the iris?

Dr. de Vincentiis.—I perform my operation in both cases, and always with advantage. It is, however, especially indicated in simple chronic glaucoma.

Dr. Businelli.—I would like to know if *Dr. Sgrosso* has ever seen the excavation of the disc disappear after incision of the angle of the iris. In my career as an oculist I have never seen such an occurrence after iridectomy; I have only seen the arterial pulsation disappear and tension diminish.

Dr. Sgrosso, in a case operated upon by incision of the angle of the iris, has had the satisfaction of seeing the excavation of the disc disappear. In several cases he has noticed an appreciable diminution in the size of the eyeball and changes in refraction, more particularly in cases of hydrophthalmia.

Dr. Gosetti.—Is this operation of great use also in hydrophthalmia? Is its effect lasting? It is quite important to know this, as the effect of iridectomy is permanent.

Dr. de Vincentiis.—The operation is indicated in hydrophthalmia, and also in acute glaucoma. Iridectomy is a very good operation, but it should give place to this operation. The action of iridectomy is very much like that of incision of the angle of the iris, by reason of the traction made upon the iris with the forceps, which is transmitted through a large extent of the iridian angle. It cannot be stated whether the good effects obtained from incision of the angle

of the iris will be as durable, since I have only performed the operation for a few years. A patient operated upon four years ago under very bad conditions still completely preserves the good result of the operation.

Dr. Reymond, since the first publication of de Vincentiis, has found the operation quite rational, and has performed it several times. He advises *Dr. Sgrosso* to carefully examine the visual field for colors before the operation, as, if the operation succeeds, even when the visual field for colors is much retracted, it will have a great advantage over iridectomy, the effect of which under these conditions is highly problematical.

Contents of the Orbital Cavities of a Pig Blind from Birth.

DR. SGROSSO.—The specimens came from the agrarian school of Portici. With the unaided eye, nothing could be seen suggesting the form of an eye. On microscopic examination, a bulb, the sclera, the ciliary body, and some remnants of the choroid were found. The place of the eye was occupied by a dermoid, in which could be seen cartilage and modified sudoriparous glands.

Bacteriology of Acute Conjunctivitis.

DR. GASPARRINI (Vienna).—He is convinced, with the majority of oculists, that the clinical and anatomical classifications of conjunctivitis is no longer sufficient, and that an etiological classification should be employed. A few years ago one still spoke of only one form of acute conjunctivitis, which was called catarrhal. To-day several forms are distinguished from bacteriological examination and also from the clinical form. They are:

1st. *Acute contagious conjunctivitis* (bacillus of Weeks), similar to the form described by Koch in 1884, and studied last year by Morax, who has given a very good description of it. The speaker has had mixed cultures only six or seven times in fifty observations.

2d. *Pneumococcus conjunctivitis* is the most common after the preceding. Morax and Parinaud consider the disease as belonging exclusively to young persons, and as almost always unilateral. It is not generally very severe, but in a child twenty-five days old the speaker has seen it give place to a diffuse infiltration of the cornea followed by ulceration, perforation, and anterior synechiæ.

This variety of conjunctivitis is also observed in adults, and sometimes its progress is longer and more severe than that of the conjunctivitis of Weeks, causing complications of the cornea and of the iris. It easily becomes chronic. In the chronic forms of conjunctivitis

tivitis with ulcers of the cornea, the speaker has always found pneumococci in the conjunctival cul-de-sac or in the fundus of the ulcer. This same microbe has been found during the acute period of old granular conjunctivitis. The true pneumococcus conjunctivitis of the new-born, as well as that of adults, was always bilateral.

In only one case, the disease remained unilateral, as the child was treated two hours after birth.

3d. *Streptococcus conjunctivitis*, which is not always accompanied or preceded by lesions of the lachrymal ducts.

4th. *Staphylococcus conjunctivitis*.—This is the rarest form of all. The speaker has only observed a single severe case produced by the staphylococcus aureus. There were pseudo-membranes and severe complications of the cornea. Bacteriological examination eliminated in a decisive manner any suspicion of diphtheria.

5th. *Biennorrhæic conjunctivitis*.—This is observed at all ages, and is, after the diphtheritic, the most severe form.

Etiology and Treatment of Several Forms of Pseudo-Membranous Conjunctivitis.

DR. O. PES.—It is very difficult to unite under definite types all the varieties of pseudo-membranous conjunctivitis caused by different infectious agents.

After a few remarks on the pathology of diphtheritic conjunctivitis, the speaker stated that we are still far from the solution of the problem of great importance—namely, whether the micro-organisms which constantly live in the meibomian secretion (Reymond) revealed, in xerosis and in various ocular affections, as inoffensive parasites, and morphologically resembling the bacillus of Klebs-Loeffler, are attenuated varieties of this same bacillus, or whether they belong to distinct groups of the same family. Considering the possibility, demonstrated by observation, that pseudo-membranous conjunctivitis is brought about by the Klebs-Loeffler bacillus, and, on the other hand, the innocuousness of injections of anti-diphtheritic serum being assured, the author thinks that in all cases of conjunctivitis of this description, which may seriously compromise so important an organ, these injections should be immediately performed.

Sterilization of the Conjunctival Sac.

DR. BARDELLI (Sienna).—The investigations were made with formol, and the cultures were made from the contents of the sac before and after irrigation with a $\frac{1}{1000}$ solution or with a simple aseptic fluid. The results obtained were the following:

(a) From antisepsis performed immediately before the operation

by Morax's method, and at the same time employing the most rigorous asepsis, there was a numerical reduction of the colonies of 90.24%.

(b) From rigorous asepsis and irrigation with neutral carbonate of sodium and sterilized water, the reduction only reached 60%.

(c) From asepsis and antiseptics performed not only before the operation but also some time before, and by using compresses, the reduction was 98.12%.

The speaker emphasizes the technique of the investigation, and endeavors to show that beef tea is preferable as a culture fluid to gelatine. The beef tea may be poured into the conjunctival sac while the patient is lying down, a blepharostat being applied to the eye. The advantages are considerable—extensive contact of the fluid with the conjunctiva, and the sure knowledge that before and after irrigation one is experimenting with the same quantity of fluid.

The speaker formulates the following conclusions :

1st. Contrary to what has been affirmed by Strocheim, Bach, and Morax, irrigation with a physiological solution, simple mechanical cleansing is of no value ; it is necessary to have careful antiseptics combined with rigorous asepsis.

2d. Antiseptics should be performed not only before the operation, but also several days before. The moist compress applied twelve hours before the operation is of great service, from its action on the skin and on the cilia.

3d. Absolute sterilization of the conjunctival sac cannot be obtained, but in most cases the operator can avoid complication, for only exceptionally do pathogenic germs remain in the conjunctival sac.

The Action of the Toxines of Streptococci on the Eye.

DR. BARDELLI.—For the purpose of verifying Dr. Parinaud's assertion that the iritis which frequently accompanies streptococcus conjunctivitis is the result of the penetration of streptococci or their toxines to the iris, the speaker has experimented on rabbits' eyes with virulent streptococcus toxines. The results of the experiments, which were not very numerous, were as follows :

(a) By injection of a few drops into the anterior chamber an iritis was excited which disappeared in eight or ten days.

(b) By injection of a cubic centimetre under the conjunctiva there was produced an injection of the conjunctiva with slight secretion, which disappeared in four or six days.

(c) By frequent instillations into the conjunctival sac a severe conjunctivitis was induced, followed by iritis and keratitis.

Penetration of Small Shot into the Eye.

DR. G. OVIO (Padua).—Clinical observations and experiments have proved beyond a doubt the remarkable tolerance of the eye for this class of foreign bodies. The speaker thinks that the fact is explained by the round form of the foreign bodies and their smooth surface, by the slight chemical action of the substance of which they are composed, and by their aseptic condition at the time of the explosion.

He has made a number of experiments on rabbits. He loaded a pistol with shot carrying pyogenic germs, and shot it at rabbits or boxes containing the gelatine culture. Neither in the wounds nor in the gelatine was there any development of germs. Shot infected in this manner, which had been dried and placed several days later in sterilized beef tea, very quickly produced colonies of pyogenic microbes.

Lead shot sterilized by boiling and introduced into the anterior chamber and the vitreous of twenty-five rabbits produced no disturbance. In support of this assertion the speaker exhibited three rabbits with normal eyes, in spite of the presence of shot visible in the anterior chamber and in the vitreous, which had been introduced six months before, after sterilization.

Capsulo-Lenticular Extraction.

DR. GRADENIGO (Padua).—This method of operation, which should be the desideratum, has never been greeted with enthusiasm. All the methods successively invented, in spite of the success claimed by the authors, have been abandoned, and now the subject is no longer discussed. What is the reason for this? It would be, however, quite worthy of the careful investigation of all oculists.

The speaker has pursued this aim for some time. He has noticed that the greatest difficulty comes from the resistance of the circular ligament of the lens. If this resistance is diminished, the lens escapes with ease.

He has had a special instrument constructed—a kind of hook or curved cystitome. When the incision of the cornea has been made he performs an iridectomy, and inserts the instrument under the iris until it reaches the zonula. He then turns the point toward the zonula, which he incises extensively all around the lens. Operations performed in this way are not very numerous, but in the cases already operated upon he has been able to extract the lens in its capsule with ease and without complication.

Diffusion Circles.

DR. G. OVIO (Padua).—By a very simple calculation, the speaker

has determined the formulæ of the principal laws of circular diffusion. He reviews the calculations made by other authors, and finds that their conclusions are not always correct. By the formulæ thus obtained, the speaker has calculated the different diameters of diffusion circles in emmetropic and ametropic eyes, with pupils of different amplitudes and for focal errors of from 1 to 20 dioptries, and the distance of the retina from the point of crossing of the rays which produce these diffusion circles.

‡ The speaker then discussed the influence of diffusion circles on vision, and remarked that on this question literature is full of errors, which depend in part on the fact that the conclusions drawn from observations of luminous points have been applied to occurrences which should be produced by examining the images of objects of some dimension, and *vice versa*. Luminous points give diffusion circles the surfaces of which are uniformly illuminated. The images of real objects seen with diffusion circles have diffuse borders. These borders may touch, and even be in part superimposed, without the eye ceasing to perceive the form, while if the images of diffuse luminous points touch or are partly superimposed, confusion is immediately established. Hence, if the calculation is made for luminous points, it will be found, for example, that 1 dioptrie of focal error causes a diminution in vision to about $\frac{1}{4}$, while if the usual type objects are used in the experiment, it will be found that vision descends at the most to $\frac{1}{3}$. The difference of vision between calculation and practice does not need to be explained by the problematic intervention of coefficient of exercise, or by artificial hypotheses; all is easily explained by the difference above mentioned between diffuse images of luminous points and those of real objects.

Persistence of the Canal of Cloquet, with Vestiges of the Hyaloid Artery.

DR. PICCOLI (Naples).—Published cases of the persistence of the canal of Cloquet are rare. The case of the speaker was that of an individual twenty years of age examined for syphilitic iritis.

On lateral illumination a number of small grayish striæ, interlaced in the most capricious manner, were seen on the posterior pole of the lens. With the inverted image a chord could be seen, having undulatory movements corresponding to the movements of the eyeball, and passing from before backward through the vitreous, which was perfectly transparent. This chord was formed from behind forward of two distinct portions. The first, having somewhat the appearance of a lemon-seed of pearl-gray color, with a ribbed surface, was adherent to the disc at the point of convergence of the central vessel

of the retina by a short peduncle with a diameter equal to that of one of the first branches of the central artery; it then enlarged rapidly, and extended upward, inward, and forward, terminating in a free blunt extremity in the vitreous. The other part of the chord, several times longer than the preceding, and continuous with it, was quite cylindrical, and terminated a short distance from the posterior pole of the lens with pointed extremity, producing a reflex varying between gray and fuliginous, and having undulatory movements which were particularly evident in the anterior free portion.

From the superior external border of the disc a large quantity of fine grayish filaments was given off, which reached the bulbar portion of the chord. In the lower external sector of the disc, at a distance equal to one-half the diameter of the disc, was noticed a large mass of pigment with a halo of atrophic choroiditis and diffuse depigmentation of the choroid at the posterior pole.

The speaker made the following conclusions:

1st. That there had been an inflammatory process in the interior of the eyeball.

2d. That this process must have been produced during intra-uterine life, when all the constituent parts of the eyeball were formed and the hyaloid system still persisted.

3d. That this inflammatory process, under these conditions, had brought about thickening of the hyaloid system, which had not disappeared afterward. Hence, it may be said that this observation on the one hand confirms the opinion of Van Duyse that an intra-uterine phlogosis, a perivasculitis, or a neuro-retinitis, and in this particular case, a chorio-retinitis, was the cause of the sclerosis and the persistence of the hyaloid system, while the absolute independence of the hyaloid chord from the lens confirms the assertions of other authors on the antero-posterior elongation of the eyeball. The screw-shaped form of the capillary portion of the chord, which was proof of the retractility of the hyaloid artery, is quite in accord with the anatomical observations of Gama Pinto and of Gless, as to the existence of muscular fibres and a strong adventitial membrane in this artery, and is, at the same time, a demonstration of the fact that the dilatation in the form of an ampulla observed by Mitvalski has no relation to cases of this kind, and should be considered as cystic dilatation of the hyaloid system at the disc.

Carcinoma of the Lachrymal Sac.

DR. PICCOLI.—I can find no case in literature of carcinoma of the lachrymal sac.

This disease was observed in a woman fifty-six years old, who, after

suffering from acute dacryocystitis, noticed the appearance of a tumor, which grew to considerable size in eight or nine months. The tumor was removed, but recurred in the same place, and the patient succumbed after three or four months to the cancerous cachexia.

On autopsy, it was found that the tumor had destroyed the entire anterior wall of the superior maxillary bone, the internal and the inferior portion of the orbit, the roof of the nose, and the ethmoidal and sphenoidal sinuses, without succeeding in making a way into the cranial cavity, and without producing any metastasis in the lymphatic glands or in distant organs.

On histological examination it was found that the epithelial cells contained in the connective tissue partitions were all of cylindrical form.

One noticeable fact was the following: In the sections it was observed that it was not epithelium which infiltrated the connective tissue, but the connective tissue cells of the walls of the partition which formed in the interior of the alveoli, and, by anastomosing, formed secondary segments.

According to Dr. Piccoli, it is by this method of development that the lack of metastasis can be explained, in spite of the malignant nature of the tumor.

Dr. G. Sgrosso, as a sequel to Dr. Piccoli's communication, communicated two cases which he had observed of tumor of the lachrymal sac. In the first case the tumor (sarcoma) had affected the maxillary and the ethmoidal sinuses, so that operation could not be considered.

The second case was one of carcinoma following polypus of the nose. The tumor extended to the orbit, to the brow, and to the nose, was pulsating, and the pulsations were synchronous with the pulse.

A Case of Tumor of the Retina.

DR. BOCCHI (Cremona).—The speaker gave the history of a case of tumor of the retina which from numerous signs was supposed to be of sarcomatous nature. It had no connection with the choroid, as this could be seen to be perfectly healthy in its entire extent. The tumor, doubtless, was in the retina, and seemed to originate in the vessels.

Gumma of the Ciliary Body.

DR. GALLENGA (Parma).—The patient was a man forty years old. The gumma in the ciliary body had appeared two months after primary infection. It had continued to invade the anterior chamber to a greater and greater extent for a month and a half. After tha

time it commenced to diminish, and completely disappeared, leaving partial atrophy of the iris in its place. Iridectomy was then performed with a very successful result.

A Special Form of Keratitis.

DR. GALLENGA.—The two cases were dendritic keratitis, which had started with the appearance of herpes. This is not a rare form, but is difficult to diagnose. It belongs to the class of superficial keratitis with infiltration, but without vascularization, described by Sæmisch.

Acute Conjunctival Catarrh Caused by a Dipterous of the Family Tachinidæ.

DR. BAQUIS (Livourne).—The speaker observed in one individual a number of larvæ of an insect a little more than a millimetre in size lodged in the conjunctival sac. They were very mobile, but if an attempt was made to remove them they became firmly fixed to the conjunctiva. They had produced a decided reaction in this mucous membrane. To relieve the patient of them, cocaine was instilled into the conjunctival sac. This paralyzed all movement of the larvæ, which could be then easily removed.

Dr. Gradenigo.—Was this reaction of the conjunctiva caused by some fluid which had been secreted by the larvæ? Every one knows the great irritation which may be produced in the conjunctiva by ants, from formic acid.

Dr. Baquis.—I cannot reply definitely to this, but I think it may be explained by the fact of the numerous mobile appendices of these larvæ, which they employ for locomotion and prehension.

Dr. Raymond.—In connection with parasites of the conjunctiva, I recall two cases in which larvæ in the conjunctival sac produced very severe local symptoms of irritation.

Rare Phenomena in a Case of Detachment of the Retina.

DR. BAQUIS.—This was a case of detachment of the retina following a traumatism. Several months later the visual function was re-established in the part which had been detached. But the patient then noticed that he saw objects inverted in the horizontal sense, a fact which leads one to suppose that the retina functionated from luminous impressions received on its external surface. This fact, if such were the case, would demonstrate that the retina, detached from the choroid, may preserve its vitality for a long time by the sole means of the circulation of the retinal vessels.

Dr. Raymond.—He has also observed special metamorphoses of vision in cases of detachment of the retina.

Dr. Businelli recalls a similar case which he saw several years ago, some time after detachment of the retina.

Contribution to the Pathological Anatomy of Eyes Containing Foreign Bodies.

DR. G. MOAURO (Naples).—Examination of four specimens. The following general conclusions: 1st, a proliferation of the endothelium of Descemet's membrane; 2d, hemorrhagic cysts in the vitreous; 3d, cystic dilatation of the space of Fontana; 4th, participation of the cells of the vitreous in the common process of chronic inflammation.

The speaker has also examined four eyeballs injured with small shot. He exhibited drawings showing their course in the interior of the eye and the alterations which they had produced.

A Special Action of Cocaine on the Visual Function.

DR. G. OVIO.—After verifying the experiments of *Dr. Cavazzani*, which demonstrated that cocaine injected into the vitreous and into the tissues of the orbit near the optic nerve produces temporary blindness, the speaker, by other experiments on rabbits and frogs, has been able to find that as the result of these injections the production of visual purple is slackened, and that a disturbance is produced in the movement of pigment in the pigmented cells of the retina. This is an indirect contribution to the present theory, which attributes the highest role in visual phenomena to the production of purple and to the movements of the pigment epithelium.

Ocular Thermometry and Stethoscopy.

DR. BASEVI (Venice).—The investigations were made with *Dr. Gradenigo's* ocular thermometer. They determined variations in temperature produced by the instillations of certain substances in the conjunctival sac.

The speaker exhibited an ocular stethoscope, a modification of that of *Dr. Gradenigo*, with which he had found: 1st, a difference between the muscular bruits of the recti and the oblique muscles; 2d, a difference of bruits during accommodation; 3d, a difference of bruits between myopic and hypermetropic eyes. He recommends thermometry and stethoscopy as valuable methods of diagnosis.

Dr. Baquis.—These would certainly be very powerful aids in diagnosis, but such investigations are extremely difficult to perform.

A Case of Leptothrix Buccalis.

DR. BASEVI.—In a case of conjunctivitis with purulent characteristics this parasite was found in the secretions. The speaker thinks it was the cause of the conjunctivitis.

Surgical Treatment of Trachoma.

DR. BASEVI.—This consists in incisions of the conjunctiva and irrigation with a solution of nitrate of silver. He announces quite extraordinary results. In only one case was there formation of symblepharon.

Dr. Gosetti.—Thinks that this complication would be so frequent with this form of treatment that the practice, which is not at all new, should be wholly condemned.

Dr. Baquis expressed the same opinion.

Dr. Guaita also thinks that this treatment should not be recommended. He takes occasion to again recommend the treatment with sublimate which he proposed in 1886.

Dr. Bacchi, who has investigated the surgical treatment of trachoma proposed by Dr. Abadie, has come to the conclusion that this form of treatment may not only produce complications, but that it does not even destroy the granulations, a fact of which he is assured by histological examination.

Croup and Diphtheria of the Conjunctiva.

DR. GOSSETTI (Venice).—Until lately, the division made by von Græfe into croupous, pseudo-croupous, and diphtheritic affections of the conjunctiva agreed perfectly with clinical observations. At present, bacteriological investigations tend to modify greatly the ideas of the pathogenesis of these diseases, attributing them to the bacillus of Loeffler by itself, or associated with other pathogenic germs which would be capable of producing most varied manifestations, from a very thin pseudo-membrane to the most severe diphtheritic infiltrations. If these ideas are accepted it is no longer possible to grant any difference of nature between the two processes, which simply remain two different shades of the same morbid process. Sourdille has stated that to the presence of long and thin bacilli, few in number, correspond the lighter forms of croupous conjunctivitis; to thick and short bacilli, folded on themselves, correspond the forms of medium gravity; curved bacilli interlaced in intricate forms, and alone or associated with streptococci, are the cause of the true severe diphtheritic form.

The author desires in no way to doubt these conquests of bacteriology, but he thinks that the conclusions have been too hasty.

On the subject of diphtheritic and pseudo-diphtheritic forms he calls attention to a fact of daily observation. While pseudo-membranes very frequently occur in the most varied forms of conjunctivitis, it is very rare, on the contrary, to observe real diphtheria,

primary or associated with diphtheria in other parts of the organism. This rarity is still more striking if it is compared with the frequency of diphtheria of the throat, with its great infectiousness and the proximity of the eyes, which are indeed in continuity with it through the lachrymal duct.

The speaker asks if diphtheria of the conjunctiva is really produced by the bacillus of Loeffler alone, or associated with streptococci? In the affirmative case, does the great rarity of ocular diphtheria depend upon the slight receptivity of the conjunctiva for this bacillus? Is this slight receptivity to be attributed to the tears which constantly water the conjunctiva, or to the presence of other micro-organisms which successfully contest the ground with the bacillus of Loeffler and the streptococci.

FRENCH CONGRESS OF MEDICINE

Second Session, held at Bordeaux, August, 1895.

Treatment of Dacryocystitis with Fluorol.

DR. DUCLOS (Bordeaux).—In the treatment of dacryocystitis in its various stages I have employed, at Dr. Lagrange's clinic, an antiseptic but little used at present, and which deserves greater notice. This antiseptic is fluoride of sodium, or fluorol—a bluish white salt, inodorous, of a salty taste, and soluble in 25 parts of water.

Fluorol in the proportion of $\frac{1}{100}$ instantaneously and definitely arrests organic fermentations, but does not suspend chemical fermentations. It is an anti-putrid, not an anti-ferment.

Solutions of $\frac{1}{100}$, and even $\frac{1}{1000}$ prevent the development of pyogenic bacteria.

Fluorol is preferable to sublimate, which is sixteen times more toxic, to nitrate of silver, to permanganate of potash, to formol, etc. from the fact that first injections into the lachrymal canals are no painful, and in particular from the curative effect which I have found that it possesses.

Dr. Lagrange thinks that the good results obtained with fluorol in dacryocystitis where injections of sublimate have failed are due to the fact that fluorol does not coagulate albumen. The microbes are not protected against it by an envelope of albumen, and hence are more easily attacked.

Furthermore, the mucous membranes of the lachrymal passages tolerate injections of fluorol, which are neither caustic nor painful, without the slightest reaction. It produces no irritation. The mucous membrane is less vascularized than by other antiseptics, and hence presents a less favorable culture medium.

Whatever be the mode of action of fluorol, it is certain that all cases of dacryocystitis are very rapidly improved and frequently cured by injections of a $\frac{1}{100}$ solution.

Leprosy of the Bulbar Conjunctiva.

DR. LAGRANGE (Bordeaux).—All varieties of leprosy may be found in the eye. Anæsthetic leprosy attacks the cornea, producing xerosis and lagophthalmus. The tubercular form produces tubercles on the sclero-corneal juncture similar to those which are formed on the skin. Various authors consider corneal leprosy as being more frequent than conjunctival leprosy. I have, however, observed a case in which the cornea was intact, although there was all about it a circle of leprous nodules developed in the conjunctiva.

Although the cornea was untouched, the iris was seriously affected in the form of a sub-acute adhesive plastic inflammation. The infectious element had gained the anterior chamber through its angle before attacking the cornea.

Histological examination proved the presence of the leprous cells of Virchow—that is to say, an immense quantity of the bacilli of Hansen included in the connective cells. Inoculations in the anterior chamber of rabbits' eyes were sterile. Ablation and cauterization of the diseased portion with the thermo-cautery had given the best results, but it has not been possible to perform a successful iridectomy, on account of recurrences of adhesions of the iris.

FRENCH CONGRESS OF ALIENISTS AND NEUROLOGISTS

Sixth Session, held at Bordeaux, August, 1895.

Hemianopsia of Hysterical Origin in a Person Who Had Epileptiform Seizures After Trephining.

DR. LANNOIS (Lyons).—A man who had been struck with a loaded stick on the right side of the head two years previously and had been trephined for removal of the bony splinters had afterwards attacks of Jacksonian epilepsy. After a series of these attacks there

was found to be hemianopsia and deep anæsthesia with loss of muscular sense on the left side. A short time after, the anæsthesia became segmental anæsthesia, which disappeared rapidly on application of electricity, and at the same time the hemianopsia was replaced by concentric narrowing of the visual field.

The patient recently returned to the hospital with the same symptoms of anæsthesia and of hemianopsia, which are probably hysterical and similar to cases reported by Dejerine and Vialet (neurasthenia and traumatic neurosis), and more recently by P. Janet (hysteria).

THIRD INTERNATIONAL CONGRESS OF PHYSIOLOGY

Held at Berne, September, 1895.

Vision for Colors in an Eye Accommodated for Darkness.

DR. KNIES (Fribourg-en-Brigau) discusses the fact that the eye accommodated for black sees colors otherwise than when it is accommodated for light. It only perceives differences of intensity, without distinction of color. Hering has explained this phenomenon by stating that the elements which perceive light and shade are alone active in this case. The speaker explains it by a special arrangement which consists in the fact that the rods alone have the property of accommodating for darkness, while the perception of colors belongs to the cones.

FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCES

Twenty-fourth Session, held at Bordeaux, August, 1895.

Ocular Disturbances in Polymorphous Erythema.

DR. A. TERSON (Paris).—Two more cases, combined with those already published in the thesis of Beaudonnet (Paris, 1894), establish the fact that in the course of polymorphous erythema large lumps may appear on the bulbar conjunctiva, especially in the internal region of the eye. This eruption is very threatening in appearance, and is frequently bilateral. It disappears in eight or ten

days, without leaving a trace. The functional disturbances are insignificant.

The pathology of the conjunctiva has no other example of an eruption of such rapid and extensive development with so benign a prognosis.

No local treatment is necessary.

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of October 8.

Operation for Granular Entropion.

DR. CHEVALLEREAU.—The methods employed for granular entropion have not given very successful results, and recurrences are frequent. They also frequently have the fault of being very complicated. I have endeavored to find a simple process easy of execution, and for about a year have performed the following operation :

After sub-cutaneous injection of cocaine, I apply Snellen's, or, better, Knapp's forceps, then incise the skin of the lid, parallel to the free border in its entire extent about 3 millimetres from the border, dissect the skin, on one side to the free border and on the other to the upper border of the tarsal cartilage (it is, in fact, almost always the upper lid). When the orbicularis muscle is thus laid bare in the operative field, I remove it with forceps and dull-pointed scissors, so as to completely uncover the tarsus. The skin being retracted on each side, a sharp bistoury is inserted at the commissure placed at the left of the patient (the surgeon standing behind), near the free border of the tarsus, and is plunged obliquely from behind upward toward the conjunctival cul-de-sac. The bistoury does not stop until it encounters the ebonite plate of the lid forceps. Incision is thus continued from one extremity of the tarsus to the other. Then the point of the bistoury is directed backward and downward, and a second incision is made in the tarsus with the same limits as the preceding, encountering the conjunctiva in the same line, so that between these two incisions a wedge or triangular prism is removed from the tarsus one of the edges of which corre-

sponds with the conjunctiva, while the opposite face, as large as possible, is directed forward.

I then take a fine curved needle, with No. 00 catgut, and insert it about 1 millimetre below the inferior lip of the wound in the tarsus in the middle portion. The needle should include about half the thickness of the tarsus. It is then passed into the upper fragment where it should include about the same thickness, and comes out 1 millimetre above the line of section, or sometimes in the suspensory ligament, when nearly the entire tarsus has been removed. I then thus apply three sutures and tie them, so that the two lips of the tarsal wound fit exactly, and then withdraw the lid forceps and rapidly bring together the borders of the skin which had been separated and apply a bandage.

When this bandage is withdrawn, on the fourth day, it is found that the cutaneous wound is already cicatrized and scarcely visible. There is but little swelling, and no pain.

This process is very simple and easy of execution, and respects the integrity of the skin, which soon shows no visible trace of cicatrice. The catgut sutures are rapidly absorbed, and give no further trouble. No complication is possible. There is no destruction of cilia, nor necrosis of a portion of the palpebral border, such as have been seen in some cases of ciliary transplantation. Finally this method (there may be no more assurance against recurrences with other methods) seems to me to present as energetic a remedy as possible for the cause of the trouble—namely, incurvation of the tarsus.

Dr. Valude.—Dr. Chevallereau sees but one fault in this method which is that it is no more of a guarantee against recurrence than other methods. This fact leads me to mention a process well known to you all, and which I employ exclusively because I find it excellent and reliable. I have never been unsuccessful with it, and it succeeds where other methods have failed. I mean the process of Anagnostakis modified by Dr. Panas. The method is well known. After incising the skin under the free border and separating the skin below to the ciliary bulb and above to the suspensory ligament, the section is made through to the bone plate, or if it is desired, the tarsal cartilage is resected. Then a suture is passed, not from one lip of the cartilage to the other, as Dr. Chevallereau recommends, but from the suspensory ligament to the ciliary bulbs. The effect of the sutures is thus greatly reinforced, and the tarsal cartilage is turned completely outwards. It is by this

this energetic reversing action that I have never seen recurrences after employment of this method. The cartilage is at first deformed, but after the section and adjustment of the sutures it regains its position, just as bone with a faulty callus is straightened after removal of the osteotome.

Dr. Vignes has been greatly satisfied with this method, which he always uses.

Dr. Parent.—I also approve of *Dr. Valude's* conclusions in regard to *Dr. Panas' method*, and would add that its advantage over that of *Dr. Chevallereau* is that the suture is supported by the ligament instead of penetrating the cartilage. Sutures passed through cartilage may be cut and not hold. *Dr. Panas* emphasizes this point, which he considers as very important.

Dr. Darier.—I should hesitate to completely section the cartilage through fear that the freshened lips of the wound would irritate and possibly injure the cornea with which they would be in contact. To avoid this, I do not section the cartilage, but otherwise following the same operative procedure, I resect an incurved and superficial portion of the cartilage so as to enable it to be straightened by the means of the suture. I perform this resection by dissecting the tissues above the lower border of the tarsus and dividing the latter into two layers with the point of a bistoury.

Dr. Valude.—I have performed these operations many times, and I have never seen the cornea present the slightest lesion as the result of complete suture of the tarsus.

Dr. Chevallereau.—The advantage in my process seems to be its simplicity, for after the catgut sutures are once properly placed I have no further trouble with them. Furthermore, I have sometimes seen necrosis on the free border of the lids as the result of *Panas' method*.

Dr. Masselon.—Under the title of rational operation for entropion, I have recommended a process similar to *Dr. Darier's*, and which consists in laying bare the tarsus and then progressively thinning it by removing lamellæ from the cartilage with the flat blade of a bistoury.

When I have transformed the cartilage, formerly hard and crooked, into a thin flexible lamella, I then insert sutures which act according to the effects desired. This process has given me great satisfaction.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Archives of Ophthalmology

Reviewed by Dr. SULZER.

VOL. XXIV., No. 2.

I.—On the Probable Hemorrhagic Origin of the Striated Affections of the Retina, by Dr. HOLDEN.

The author has observed the development of typical retinitis striata as the result of retinal hemorrhages. He concludes that the pigmented angioid streaks of the retina are commonly of hemorrhagic origin, as is also retinitis proliferans. Such is, furthermore, the opinion of most authors who have described this affection, and who have given an opinion on its origin. Caspar alone, who gives a colored illustration of a case of pigmented retinitis striata in the Helmholtz Festschrift, attributes it to disturbances of the choroid.

II.—The Lens-Star Figure of Man and the Vertebrates, by Dr. PERCY FRIDENBERG.

A handsome lithographic plate, to which the reader is referred, gives twenty-one figures of the lens star. The first five give the theoretical representation according to Huschke, Wernecke, and Arnold. The figures observed by the author in the human eye, and in the lens of the calf, ox, pig, and other vertebrates, are quite different.

III.—A Tumor of the Ciliary Body, by Dr. MITVALSKY.

There are found in literature thirty cases of primary tumors of the ciliary body with almost identical characteristics. They are hemispherical or loaf-shaped, springing from a particular portion of the ciliary body, and leading to iridodialysis, opacities of the lens, and later to the formation of episcleral nodules. They are composed of long spindle cells in interlacing bundles, and are irregularly mottled with pigment. Six of these tumors were considered as myomas or myo-sarcomas of the ciliary body. Mitvalsky thinks that the sarcomatous spindle cells were mistaken by these authors for unstriated muscle fibre. In his opinion all tumors composing the clinical group described are spindle-celled sarcomas.

IV.—The Anterior Outflow Channels of the Eye, and the Artificial Production of Glaucoma, by Dr. M. KNIES.

Dr. Knies considers the views of ocular filtration held by Dr. Leber and his pupils as too exclusive. These views are that the

aqueous humor is secreted by the ciliary processes, and that the cornea is impermeable for fluids and solutions as long as the epithelium of Descemet's membrane is intact. These solutions leave the anterior chamber exclusively through the sclero-corneal junction. Before giving the results of his experiments on the outflow channels the author makes a few statements on the subject of the conclusions to be drawn from injections of different substances into the living or dead eyeball. There must necessarily be a current flowing from the arterial capillaries to the lymphatic vessels. Substances in solution, gases included, spread toward the points where their concentration is least. Different substances may move at the same time in opposite directions : oxygen, for example, goes from the capillaries to the tissues, while carbonic acid gas moves in the opposite direction.

In investigating currents of fluids in the eyes substances are employed which do not occur in the normal eye. In a dead eye these substances spread equally in all directions, according to the laws of physics, being affected exclusively by the different degrees of facility for imbibition and diffusion afforded by the different tissues. In the living eye, on the other hand, the propagation of dissolved substances will be modified by currents existing in the tissues.

The author's former experiments made with ferro-cyanide of potassium show that substances in solution may traverse the cornea in both directions, and that the aqueous humor is not derived exclusively from the ciliary bodies, but that the posterior portions of the eyeball contribute to its formation.

The present experiments were made with oil of turpentine, diluted with two parts of olive oil, and injected into the middle of the vitreous. The author supposes that the points to which the normal current of the eye will carry this agent will be recognized by inflammatory reactions and will thus give information of the direction of these currents. Later, the mixture of oil of turpentine and olive oil was replaced by a mixture of mercurial ointment with olive oil and oil of turpentine. These injections produced a transitory attack of glaucoma, which Dr. Kuies explains by the formation of clots in the lymphatic interstices of the sclero-corneal juncture, a formation rendered probable by the presence of fibrinous clots in the anterior chamber. In some cases these coagula contained cellular elements, and more rarely the presence of an irritating substance in the eyeball produced œdema or cellular infiltration of the cornea. The latter came from invasion through the angle of the anterior chamber.

The author makes the following conclusions : Injections of irritat-

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The inflammatory process provoked by injection of irritating substances disappeared in a short time, or produced cellular infiltration of the angle of the anterior chamber, but not adhesive inflammation. This explains why it was impossible to obtain continuous occlusion of the angle of the anterior chamber, as it exists in fully developed glaucoma.

Nevertheless, these injections produced the clinical condition of prodromal glaucoma, and, from the anatomical point of view, an isolated inflammation of the angle of the anterior chamber and the optic nerve. To produce permanent glaucoma, the irritating action must be permanent and less intense. A sarcoma of the choroid or a displaced lens may act in this way.

These experiments show that the conception of the neurotic nature of glaucoma cannot be maintained. With clinical experience and pathological anatomy, they show that simple glaucoma should be considered as completely distinct from the different forms of inflammatory glaucoma. The first is an atrophy of the optic nerve with excavation, the second an anterior irido-cyclitis of variable intensity. This point of view enables one to harmonize the clinical symptoms and anatomical alterations and to establish real and characteristic nosographic entities.

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XII.—A Second Attack of Papillitis Occurring in a Case of Post-neuritic Atrophy of the Optic Nerves, by Drs. DE SCHWELITZ and THOMPSON.

The patient first came for consultation in February, 1891, complaining of headache and epileptic seizures. One of his brothers was insane, and his mother had died of some nervous disease. His first attack occurred in December, 1889, and since then he has had seven attacks at intervals varying from one day to four months. These seizures occur soon after breakfast, the convulsive movements involving first the left arm, then the leg, face, and, finally, the whole body. At this time the visual organ appeared to be normal. On May 28 symptoms of commencing papillitis appeared, and were fully developed at the next examination in March, 1893. A short time after, the patient was trephined over the right motor centres, and it was believed that the tumor was localized, but that it was not removable. In December, 1893, vision of the right eye was normal, but that of the left was much reduced. The ophthalmoscope showed a marked decrease of the symptoms of papillitis in the right eye, and in the left almost complete post-neuritic atrophy. In November, 1894, the patient was seized with violent pain in the head associated with vomiting, weakness of the legs, and a failing in vision which rapidly increased to blindness. On ophthalmoscopic examination it was found that there was a recurrence of the papillitis in the right eye and an acute papillitis of the left disc, which had been atrophic a year before.

The interesting factor in this case was the development of intense acute papillitis in eyes which had previously been the seat of a similar affection, which had led to partial atrophy in one eye and almost complete atrophy in the other.

A similar case has been described by Dr. Gowers (*Medical Ophthalmoscopy*, p. 56), and another by Dr. Walter Park (*Annals of Ophthalmology and Otology*, January, 1895), in which the optic neuritis was dependent upon an acute otitis media.

It is proper to add that there was a macular affection in the left eye closely resembling the appearances seen in Bright's disease.

XIII.—The Parallax Test for Heterophoria, by Dr. DUANE.

To conduct the test the patient is placed in the primary position, with head erect and eyes directed straight forward or slightly below the horizontal plane. The object of fixation, which should be twenty feet distant, may be a candle flame, but preferably is a white spot 1 or 2 cm. in diameter, upon a dull black surface of some consider

able extent. The patient's gaze being directed fixedly at the spot, a card is placed before one eye and passed alternately from that to the other, the patient being at the same time asked whether the spot appears to move, and if so, in what direction. If it remains perfectly stationary, there can have been no deviation behind the card, and the position of fixation is perfect. Any apparent movement of the disc indicates, on the other hand, a deviation of the covered eye, and enables one to determine its direction. Thus, if, on uncovering the left eye, the object appears to move to the patient's left, the position of the eye, one being covered, is such as would produce homonymous diplopia (homonymous parallax). A movement of the object to the right indicates crossed diplopia (crossed parallax)—that is to say, exophoria. If the object appears to move down when the eye is uncovered this eye deviates up behind the screen.

In order to determine the amount of these deviations, prisms of appropriate direction and strength are placed before one eye until the movement is abolished. The strength of these prisms measures the heterophoria. Thus, supposing that when the left eye was uncovered the object seemed to move down and to the left (hyperesophoria), two prisms are placed before this eye, with their bases respectively down and out, and increased in strength until the movement has become *nil*. The strength of the prism having its base down will measure the degree of hyperophoria, and that of the prism with the base out will indicate the degree of esophoria. For near points, the test is made with a small dot on a large card.

In attempting to measure heterophoria, either with the phorometer, with the Maddox rod, or Stevens' lens, the unconscious desire of bringing the two images on the same vertical or horizontal line in the first case, or of making the two dissimilar images coincide, falsifies the results of the examination, either by concealing a part or all of an existing hyperophoria or by exaggerating its amount. Complete exclusion of an eye causes all these accommodative efforts to cease. With a little patience any patient may be taught to recognize and to indicate exactly displacements of the object. Sometimes it is necessary to produce a greater amount of displacement by using a prism of 2 or 3, to teach the patient to perceive the smaller displacement which exists without the prism.

The parallax test permits of the greatest precision in measurements. A prism of $\frac{1}{2}$ degree suffices to produce or to neutralize a decided lateral parallax, and a vertical movement corrected by a prism of even $\frac{1}{8}$ degree is clearly noticeable.

The invariability of the results obtained by the parallax test distinguishes it favorably from other methods employed for the determination of the heterophoria, and constitutes its reason for existence.

The parallax test is nothing but the subjective correlative of the objective occlusion test, but is far more delicate than the latter in admitting of precise measurement.

Whatever may be thought of the rôle that anomalies of the ocular muscles play in producing direct or reflex disturbances, it is important that the data upon which our judgment of this difficult question is based should be as precise and as free from error as possible.

La Clinique ophtalmologique

Reviewed by Dr. DE BOURGON.

February, 1895.

I.—A Typical Case of Sub-retinal Hemorrhage, by Dr. MASSELOD.

The author reports a typical case of this disease, but unfortunately he lost sight of the patient.

The diagnosis rests upon the *position* (posterior pole of the eye) and *configuration*. If it is abundant, it presents the form of an incomplete circle with a flattened upper portion; if it is circumscribed, it has the form of a more or less extensive sector moulded into the depression of the macula.

II.—Treatment of Pupillary Occlusion by Extraction of the Lens, by Dr. JOGQS.

There is no better operation, according to the observations of Dr. Jogqs, for complete pupillary occlusion with total posterior synechiæ, than extraction of the lens.

As for the method of operation, it is better to extract as much as possible of the lens immediately than to wait for absorption after dissection. Iridectomy is indicated here, as it is necessary to disengage the pupil as completely as possible.

III.—Two Cases of Glaucoma in Myopic Persons, by Dr. DE SPÉVILLE.

1st. "A woman fifty-three years old, with acute glaucoma in the right eye.† There was myopia of 6 dioptries in the left eye, with vision = $\frac{3}{4}$.‡ The patient wore glasses — 4 D. 2d. A man thirty-

five years old, who wore glasses — 8 D. Four years ago the left eye had been removed for chronic glaucoma, after a total loss of vision.

IV.—Irido-cyclitis in an Eye Injured Twenty-five Years Before, by Dr. FOUCHARD.

An injury which had occurred twenty-five years before had caused a fracture of the lower orbital border, and a bony needle had penetrated the eyeball, only to manifest its presence twenty-five years later. Enucleation prevented symptoms of sympathy.

V.—A Peculiar Form of Keratitis with Relapses of Gouty Origin Cured by Colchicine, by Dr. DARIER.

Recovery was complete, but it is imprudent to give more than 2 milligrammes after the first day.

March.

I.—Latent Lachrymal Conditions, by Dr. TRUC.

Exploratory injection with an Anel syringe and probing will sometimes reveal stenosis of the lachrymal ducts when this condition does not cause lachrymation, and being thus unnoticed, may be the cause of blepharitis, conjunctivitis, keratitis, and iritis.

II.—A Case of Periostitis and Iritis After Combined Extraction of a Senile Cataract, by Dr. MANOLESCU.

This complication occurs in spite of the most careful ante-operative precautions. These had consisted of careful irrigation of the conjunctivæ with $\frac{1}{3000}$ sublimate and prolonged ocular occlusion for from twenty-four to forty-eight hours, for the purpose of revealing any latent infection which might exist in the conjunctiva.

III.—A Case of Diplopia from Paralysis of the Sixth Pair, by Dr. VIGNES.

Advancement of the paretic muscle brought about complete recovery.

IV.—Trophic Corneal Disturbances, by Dr. FOUCHARD.

These were due to the presence in the angle of the orbit of the blade of a knife 6 centimetres in length, which had been unobserved for six weeks.

V.—A Case of Sympathetic Keratitis, by Dr. JOCQS.

(See *Annales d'Oculistique*, Vol. CXIII., p. 202.)

April.

I.—Four Cases of Severe Ocular Disturbances Following Constitutional Syphilis Transmitted by Children to Their Nurses, and Observed in the Nurses or Their Husbands,
by Dr. FOUCHARD.

1st. Double ophthalmoplegia following syphilis transmitted from a child to its nurse by means of the nursing bottle, observed in the nurse. 2d. Irido-choroiditis in a syphilitic person infected by his wife, who had been infected by a child with constitutional syphilis and nursed at the breast. 3d. Unilateral optic neuritis in a syphilitic person infected by his wife, who had nursed a child with constitutional syphilis with the bottle. 4th. Iritis contracted by a young boy who had assisted his mother in caring for a syphilitic child who had been nursed with the bottle.

II.—A Case of Palpebral Phthiriasis, by Dr. VILLARD.

A case seen in the service of Professor Truc. In the lashes were found many ova of phthiriasis pubis, but only a single adult animal

III.—Anterior Sclero-choroiditis in a Child Fourteen Years Old, by Dr. DE SPÉVILLE.

This was a child born of rheumatic parents and rheumatic herself. Colchicine was used with good effect.

IV.—Ocular Troubles of a Bicyclist, by Dr. DUBOYS DE LAVIGERIE.

(See *Annales d'Oculistique*, Vol. CXIII., p. 274.)

V.—Sympathetic Ophthalmia of Rapid Progress,
by Dr. GAUPILLAT.

May.

I.—Granular Ophthalmia Along the Flemish and Zealand Coasts, by Dr. Plethincq Bauchau.

This infectious disease continues to be very common in Belgium. At Bruges, in the blind asylums, 50 per cent. of the patients lost their sight as the result of granular ophthalmia.

II.—The Method of Performing Cauterizations in the Treatment of Purulent Ophthalmia, by Dr. ABADIE.

When fully developed, the patient can only be saved by rigorous applications of cauterization every twelve hours with a 3 per cent. solution of nitrate of silver.

III.—Contribution to the Diagnosis of Vascular Tumors of the Orbit, by Dr. JOCQS.

(See *Annales d'Oculistique*, Vol. CXIII., p. 346.)

IV.—A New Type of Paralysis Associated with Horizontal Movements of the Eyes, by Dr. SAUVINEAU.

(See *Annales d'Oculistique*, Vol. CXIII., p. 361.)

IV.—BOOK NOTICES

BOOKS AND THESES

New York Eye and Ear Infirmary Report, Vol. III., Part I., January, 1895. (*Putnam's Sons*, Pub.)

Following the example of the principal London hospitals, the New York Eye and Ear Infirmary also publishes a report. The first part of the third volume contains the following articles :

I.—*Marple*. Contribution to the Pathology of Embolism of the Central Artery of the Retina.

II.—*Derby*. A Case of Pseudo-membrane of the Conjunctiva.

III.—*Gruening*. Empyema of the Ethmoidal Sinuses. Operation through the Orbit. Recovery.

IV.—*Weeks*. Our Present Knowledge of the Etiology of Acute Contagious Conjunctivitis.

V.—*Hunter*. A Case of Vaccine of the Lids.

VI.—*Esson*. Narrowing of the Palpebral Fissure in a Case of Facial Paralysis.

VII.—*Fridenberg*. Network of Straight Lines Resulting from Interstitial Keratitis.

VIII.—*Francisco*. Report of Forty Cases of Ophthalmia of the New-born.

IX.—Report of Cataract Operations.

Dr. Marple's article is very carefully written, and contains the observation of an autopsy. In the second article there is a description of a case of the but slightly known pseudo-membranous conjunctivitis of long duration (several months). The clinical symptoms are similar to those observed by Guibert (see these *Annales*, Vol. CIX., p. 457) : A false membrane slightly adherent to a loose conjunctiva, not bleeding, and the results of the bacteriological examination of which agreed in declaring the absence of the bacillus of Loeffler. Dr. Derby found a short bacillus, different from the

bacillus of Loeffler, a streptococcus, and a staphylococcus. Dr. Weeks reviews the bacteriological theories of acute contagious conjunctivitis in a general article in which he gives considerable space to the careful studies of Dr. Morax. The number of cataract operations performed from October 1, 1893, to October 1, 1894, was 124, of which 73 per cent. were simple extractions, 21 per cent. extractions with iridectomy, and 6 per cent. other operations.—S.

Two Cases of Complete Blindness of Hysterical Nature,
by Dr. A. BARKAN.

The first case was that of a man thirty-two years old, with no hereditary or personal history, who had been struck in the face by the pieces of a bottle which exploded when he was preparing to open it. He immediately lost consciousness, remained five or six hours in this condition, and on regaining consciousness discovered that he was blind. During the first week, blindness was complete and patient suffered from severe headaches. The following weeks he had periods of remission during which he could slightly perceive light, and then periods of aggravation in which the visual perception was totally lacking. Four weeks after the accident there was a decided bilateral blepharospasm. In the right eye there was a small perforating wound on the border of the cornea with anterior synechia, but no other lesions. Reaction of the pupil to light was slight in both eyes. Diagnosis of hysterical blindness was made, and douches, injections of strychnine, and application of electricity were prescribed. Six days after the commencement of this treatment the pupils reacted to light, and in a few weeks recovery was perfect and vision completely normal.

In the second patient, who was also a man thirty years of age, blindness appeared first in one eye with no provoking cause. Some months after, failing vision and then complete blindness developed in the eye which had been normal. There were no ocular lesions, apart from a small central corneal cicatrice and a slight anterior cortical opacity on one side. The pupils reacted normally. Visual perception was *nil* on one side, and on the other the patient could indistinctly perceive movements of the hand. After application of galvanic and faradic currents, vision was rapidly re-established and soon became normal.—MORAX.

Six Successive Cases of Extraction of Pieces of Steel from the Interior of the Eye with an Electro-magnet, by Dr. A. BARKAN (Society of German Physicians of San Francisco, 1895).

In five of these cases the author used local anæsthesia with cocaine, which he prefers to general anæsthesia. In four of the six cases the

foreign body (situated in one case in the anterior chamber and in five cases in the vitreous) was extracted with an electro-magnet and the eye preserved with partial restoration of vision.

V.—MISCELLANY

International Conference in Regard to the Sanitary Service of Railroads and Navigation.

According to the announcement made in one of the late numbers of these *Annales*, an international conference was organized at Amsterdam September 20 and 21, under the presidency of Professor Snellen, for the purpose of regulating the conditions which might concern the sanitary condition of railroads and navigation service.

The question presents many phases, but, without discussing them at length, it will be sufficient to review what was discussed at the sessions of the international conference. The conclusions of the reports read in the three sections of the congress were made from the sanitary organization of the service in the Netherlands.

In the first section the question of *examination for admission and re-examination of employés from the point of view of the visual function* was discussed. The commission considered periodic re-examinations of the employés in regard to vision as a necessary guarantee of their efficiency. One point which is of very great importance, considering the experience acquired in different countries, is the question of the quantitative determination of chromatopsia.

It becomes more and more necessary to have the same signals everywhere, requiring the same degree of visibility.

The second section discussed the *organization of medical service*. This chapter contains technical details of but little general interest. The only practical point was in connection with an emergency box which accompanies every ordinary railroad train. The Dutch commission desire to see these boxes increased along the roads and placed in the small stations, at the barriers, etc. It is an excellent idea, for in railroad accidents it is very common to see the injured wanting the necessary care when the accident occurs at some distance from an important station.

Furthermore, the station agents and employés, as well as the train force, should receive some instruction in first aid to the injured.

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in the fundus of the eye, together with malformation of the papilla.

3d. A typical case of persistent hyaloid artery.

VI.—A Contribution to the Occurrence and Origin of Congenital Anomalies of the Eyes, by Dr. H. WINTERSTEINER.

The author is of the opinion that the study of congenital malformations of the visual organ may throw light upon the anatomical relations of the foetal organ. He has had occasion to observe in a child thirteen years old a round opacity in the vitreous which sent prolongations to the retina and to the papilla. The papilla was white, and in the retina were white striæ with pigmented borders. The existence of double epicanthus, displacement of the retinal vessels, and tortuous veins leads the author to suppose that this was a congenital anomaly which may be considered as the result of a hemorrhagic affection.

VII.—A Case of Double Coloboma of the Choroid, by Dr. VEASEY.

This article contains a careful compilation of the opinions which have been given on the subject of diabetic retinitis and a table of the published cases. Four new cases, one of which was the author's, are added to this table, and short notes are given of the ophthalmoscopic examinations.

VIII.—Diabetic Retinitis, by Dr. OSCAR DODD.

IX.—Alveolar Fibro-sarcoma of the Optic Nerve,
by Dr. C.E. FINLAY.

X.—Traumatic Paralysis of the Abducens Nerve,
by Dr. C. ZIMMERMANN.

XI.—Congenital Monolateral Fistula of the Lachrymal Sac Situated Above and Parallel with the Inferior Canaliculus, by Dr. JOHN DUNN.

The patient, twenty years of age, had in addition to the lower normal lachrymal canaliculus, and above this, a slit also opening into the lachrymal sac. There was no communication between this slit and the lower canaliculus, and probes passed through the two openings reached the lachrymal sac by different canals. There was no sign of inflammation or catarrh of the lachrymal canals, but the patient complained that tears gathered from time to time in the internal angle of the eye. The author thinks that this abnormal opening, not provided with elastic fibres, allows the fluid which fills the sac to regurgitate, when the walls of the sac contract.

In 1754, while at Marseilles, considering that sharp-pointed needles caused the accidents which so frequently happened after ordinary operations, I devised a flat needle, blunt at the end, in the form of a small spatula, with which I thought I could better succeed in depressing the cataract after a puncture made with an ordinary needle. But experience persuaded me to the contrary, and the operation which I shall describe contributed not a little to arouse the reflections to which I owe the method I now employ.

A hermit, from Aiguilles en Provence, who had been unsuccessfully operated on for cataract of the right eye, came to me at Marseilles, begging me to operate on the left eye. I was no more successful than he who had performed the first operation. By using an ordinary needle sharp at the side, I was not only unable to depress the cataract, but several portions of the lens were broken and passed into the anterior chamber, which was filled with blood during the operation, so that my needle was no longer visible, and I was obliged to withdraw it without being able to complete the operation. This accident caused me to follow the example of Dr. Pettit (1), and to open the transparent cornea to evacuate the blood and fragments of cataract which had reached the anterior chamber, and I accomplished this by introducing a slightly curved needle into this chamber. I enlarged the first opening in the cornea with small curved scissors, and in this way everything in the anterior chamber was evacuated, the pupil appeared sharp, and the patient immediately distinguished objects which were brought before him. But as his eye had been too greatly fatigued by the first operation which I had performed, the second was unsuccessful, and was followed in two days by suppuration of the organ. The cause of these accidents was doubtless the dragging on the interior membranes and division of the vitreous humor.

The case which chance had thus presented to me caused me to form a resolution to operate only by opening the cornea, as I had done with the hermit, and to remove the lens from its capsule, to cause it to pass through the pupil into the anterior chamber, and then withdraw it from the eye. I performed this operation for the first time on a woman. I opened the cornea in the way I have explained, then inserting the small spatula of which I have already spoken to the upper part of the cataract, I detached it, and with

(1) Dr. Pettit, in 1708, performed section of the cornea to extract a lens which had passed into the anterior chamber. (See *Memoirs de l'Academie Royale des Sciences*, 1708.)

this instrument extracted it in pieces from the eye. The pupil seemed to be clear, and the patient had not the slightest accident, and was cured fifteen days after.

This successful result encouraged me to practise this method, and it was also successfully used on four patients, but it was apparently lacking in several points necessary to its perfection, since the consequences were not as successful when employed on several other patients. I thus felt that it was necessary to try another method of operating, at least to establish a comparison between these different methods, and, if possible, to find one exempt from the ordinary accidents.

I decided to perform the cataract operation with two instruments, the first of which, made of steel and shown as a small straight bistoury, was used to open the sclera at the ordinary point. Through this opening I then introduced a small spatula to the upper part of the lens, between this body and the posterior portion of the iris, and thus depressed the cataract with great ease and promptness.

A great many operations performed by this method, several of which were witnessed by the most distinguished masters of the art, were very successful, and I believed that it was proper to conclude that this method was preferable to all others which had been devised, both in instruments and manual.

I employed all varieties of needles; I also performed the operation in different ways, sometimes introducing the needle behind the lens, so as to rupture the posterior layer of the capsule, and displace the lens into the vitreous humor, sometimes I tried to open the lower portion of the lens capsule, so as to precipitate the cataract by this opening into the vitreous humor. Again I tried to introduce the small spatula on the anterior part of the cataract, which I easily depressed, but I noticed that the operation by this method only succeeded when the lens membrane was thin and very fine; then the lens was pushed under the vitreous and could not easily return to its former place, and only such accidents as are common to all this class of operations were observed. This was not the case when the membrane was firm, the cataract soft, and the vitreous humor a little too thick; then the irritation of the membranes caused by the needle and the necessary divisions of the vitreous frequently occasioned considerable accidents, sometimes suppurations in the eye and atrophy of the organ.

Although I had tried, so to speak, all the methods of cataract

operation, I was but little content with my success, and decided to make new experiments, and to examine with precision what derangement of the interior parts of the eye resulted from an operation made with a particular needle. Very different results were obtained from these observations; in truth, after several successful experiments, the pupil being clear, the lens was found in the lower part of the vitreous with no derangement of the interior parts, but at other times fragments of the lens were broken off by the needle and passed through the pupil into the anterior chamber, and in this case the more the needle was moved about in the eye the less clear it became. I frequently found great difficulty in making the lens leave its capsule, and finally it happened that I found it placed between the retina and the choroid, and these two membranes were torn in several places.

I no longer doubted that the derangement of the different parts which I had observed on the eyes of cadavers, derangements susceptible of great variations, were the cause of the disorders which are only too greatly felt by the living, and I thought that they depended not only on the introduction of a needle into the eye, of whatever kind it might be, but still more on the resistance of the membranes, and especially of the lens, according to the position which it may occupy after depression.

In fact, the more one reflects on the form of the various needles, it will be easily understood that those which are fine and pointed only make a puncture, and that as they have not sufficient surface, they cannot frequently press sufficiently on the cataract to displace it under the vitreous humor, or at least that they may cause accidents from puncture of delicate parts.

In general, needles which are sharp cut the vessel and frequently cause extravasation of blood into the eye, which hinders the completion of the operation. Those which are flat, blunt, and rounded may bruise and tear the internal membranes of the eye, and consequently produce disastrous consequences. Independently of the faults which may be attributed to the needles, it is clear that the lens by its presence will be harmful to the different portions of the eye, a fact which depends, as I have said, on the various positions which it may acquire after depression. I will not mention the accidents which the most careful operator cannot avoid whatever precautions he take.

In spite of its various inconveniences, I decided to continue, by preference, my last method, which consisted in using a sharp instru-

ment, and then a flattened needle to depress the cataract, while waiting for the idea which resulted from the operation on the hermit to acquire greater maturity. But the occurrence which I shall describe succeeded in persuading me :

On April 8, 1747, I was called to attend a man with cataracts which seemed to me to be in good condition, and the eyes favorable for operation. I first operated on the left eye, where the cataract appeared to be more solid, but I was not able to depress it ; the pupil appeared dirty after the operation, and the patient could see absolutely nothing. I then tried the right eye, with no greater success. As it was not possible by any method to depress the cataract in this eye, I decided to open the cornea, as I had done with the hermit. I dilated the opening, then raised it with a small pair of forceps, and introduced my small spatula through the pupil, with which I drew from the posterior chamber of the eye the entire lens, which was broken into several pieces as a result of the first operation. This extraction was followed by the escape of a portion of the vitreous humor which had been divided by the preceding operation, but in spite of this accident the patient could clearly distinguish objects after the operation, which had no evil consequence, and he was cured after a short time.

Since that time, and during the following three years, I performed this operation several times on living persons, to accustom myself to it little by little. But it was only during a journey which I made to Mannheim to treat S. A. S. Mme. la Princesse Palatine de Deux Ponts for an old disease which she had in the left eye that I resolved definitely only to operate for cataract by extraction of the lens.

I had occasion to pass through Liège and to stop there for some time. I there performed six operations by this method with the greatest success, and one which I performed at Cologne on a priest was most astonishing, as the cataract was soft as jelly, yet the priest was able to say mass fifteen days after the operation.

Dr. de Vermale, Associate of the Academy and Surgeon-in-Chief to the Elector Palatine, has described the operation which he saw me perform at Mannheim, in a published letter addressed to Dr. Chicoyneau, Physician-in-Chief to the King. Since that time I have continued to perform this operation in different places, and up to the present time, November 16, 1752, I have performed 206 operations, 182 of which were successful. That is, I think, a very good record for an operation which is, so to speak, only in its infancy. The following is the detail of the operation :

When it is ascertained that an eye is affected with cataract, it is of but slight importance for this method of what nature it be, old, soft, hard, or of different color; the operation will succeed equally, provided the eye is otherwise healthy, because the principal object in my operation is extraction of the cataractous lens from its sheath, which is easily done if the precautions which I shall describe are observed.

The patient is prepared according to the ordinary and common method. The day decided upon for the operation, I lay out the apparatus, which consists of bandages, compresses, small pieces of linen, plaster in oval form, small sponges, small pledgets of cotton, warm water, and wine.

The instruments which I employ are: A pointed needle, with sharp edges and slightly curved, in the form of a lancet, for making the first opening. A blunt needle, also slightly curved and with sharp edges, to enlarge this opening. Two pairs of convex-curved scissors. A small spatula of gold, silver, or steel, slightly curved, to raise the cornea. Another small pointed needle with both edges sharp, to open the membrane covering the anterior surface of the lens. A small spoon of gold, silver, or steel, to facilitate the escape of the lens, or to extract fragments of this body which may remain in the orifice of the pupil. A small pair of forceps to remove portions of the membrane which may be presented.

All these instruments are arranged in order on a chair and confined to the care of an assistant, who will hand them to the surgeon as they are required.

When everything is thus arranged, the patient should be placed in a moderately lighted room, so that too great an amount of light will not cause the pupil to contract, and will not penetrate the eye too strongly after the operation, thus causing dazzling.

The patient should be seated in a rather low chair or stool. The operator should sit in front of the patient, on a higher chair and directly opposite him, so that in operating he rests his elbows on his knees. The other eye should be covered with a bandage, after which an assistant standing behind the patient rests one hand on the forehead, holding the upper lid with two fingers, and places the other hand under the chin.

The surgeon depresses the lower lid, and taking the first needle, he introduces it into the anterior chamber near the sclera, avoiding the iris, and carries it above the pupil. He then gently withdraws it,

and takes the blunt needle, with which he enlarges the incision thus commenced by carrying this needle to the right and to the left, so as to open the cornea in the form of a crescent by following its circumference. But as the cornea will then be somewhat loose, the surgeon takes the convex-curved scissors, the blunt blade of which he introduces between this membrane and the iris, and completes the section equally on both sides, so as to extend each side a little above the pupil. It will be observed that the curvature of the scissors should correspond to that of the eyeball, and that consequently it is necessary to have two pairs, adapted to the curvature of the cornea on each side.

The surgeon then takes the small spatula, with which he gently raises the part of the cornea which has been cut, and with the small-pointed and sharp-bladed needle incises the membrane of the lens. Sometimes it is necessary to cut this membrane circularly, and to completely remove it if it is thick and wrinkled, so that it will not block the pupil, and then when this membrane has been well cut it may be removed with the small forceps.

After having cut the membrane which envelops the lens, the small spatula should be introduced between this body and the iris, so as to completely detach the cataract and facilitate its issue. The corneal cap is then allowed to fall back in place for the completion of the operation.

It is then that the surgeon requires all his prudence, for he is about to draw the curtain which obscures the light. For this purpose he must press gently on the eyeball without fatiguing it. In this way one avoids rupture of the posterior membrane of the lens, which serves as a dam, and prevents the escape of the vitreous humor. It is with great pleasure that one observes the pupil enlarge little by little, and the lens, as soon as its edge is presented, glide gently into the anterior chamber and thence to the cheek. Then the pupil appears clear, the shade which covered the eye is dissipated, and the patient, formerly plunged in darkness, again sees the light with as much astonishment as satisfaction. The pupil, which is sometimes disarranged by the escape of the lens, especially when it is hard and solid and of large size, is readjusted.

When the operation is completed the patient is turned around, to prevent the impression of too much light.

If it should happen that the cataract was soft and glairy, and that it was broken, whatever remains of it may be removed by means of

the small spoon, which the surgeon moves about the pupil as much as is necessary. After this the corneal flap is exactly returned to place, the eye is gently bathed with a fine soft sponge soaked in warm water, with a few drops of spirit of wine, or ophthalmic water. The plasters are applied over a small pledget of cotton, and the whole is kept in place with a bandage loosely applied. The head is covered with a towel, and the patient put to bed in a dark chamber, if possible on the back, and in a bed supplied with curtains.

The eye should be bathed with an emollient and resolvent decoction two or three times a day, or as frequently as it is thought necessary. One should not forget bleeding, and an exact diet, and the patient should be treated according to the ordinary rules.

Whatever preference I may think should be given to this method of operating, I cannot conceal the fact that it has its peculiar accidents, but they are of a nature easily remedied, and some of them may be prevented. For example, it may happen that during the operation part of the vitreous humor will escape from the eye, but this is surely avoided if the eyeball is but lightly pressed in causing the lens to come out.

There will be cases where it seems necessary to employ greater pressure, and if the membrane of the lens is adherent to the iris this adhesion should be destroyed with the spatula, and the pupil gives way little by little to the advance of the lens.

If it should occur, from an injury to the iris, that blood escape into the anterior chamber, it flows out readily through the incision, and this is in no way a detriment to the operation. This accident occurred to me a short time ago while performing the operation in the presence of Drs. le Dran, Morand, La Faye, and several others. The eye was no worse, and the patient sees as perfectly with it as with the other, which was operated upon at the same time.

That the entire aqueous humor escapes is a necessary inconvenience, but one of no consequence; but if the needle for opening the cornea is withdrawn too quickly the iris may follow the aqueous humor and this membrane be pinched between the lips of the wound. It is very easy to disengage it by gently raising the cornea with the spatula, and sometimes the natural movements of the eye cause it to resume its place.

In the after treatment, the iris may again escape through the opening and form a staphyloma, but this is easily remedied by returning the iris to its place, and one is almost sure of avoiding this

by taking care to dress the eye so that the bandage is not too tight, because this accident is ordinarily only the result of too great pressure.

I think that it will be readily admitted that the accidents of which I have spoken are of but slight importance in comparison with those that may occur after the ordinary operation. But these are not the only advantages of this method ; a comparison with the others will establish more noticeable ones :

1st. In operating by the old method, it is necessary to wait until the cataract is solid, and frequently it does not become so ; here the cataract may be extracted as soon as it commences and without waiting for its maturity.

2d. In depressing a cataract, however solid it may be, it may rise again after the best-performed operation, and even a long time after, and it cannot be denied that this accident sometimes happens ; with my operation, on the other hand, one is assured that a cataract which is removed from the eye will not rise again.

3d. By the ordinary method, the cataract sometimes passes entirely or partially through the pupillary orifice into the anterior chamber ; this sometimes happens during the operation, and it is known to have occurred several years after. As the cornea is not opened, the lens becomes a foreign body in the anterior chamber, the presence of which may be very inconvenient, and even lead to loss of the eye, or at least require another operation. In my method I completely remove the cataract from the eye by making it pass through the pupillary orifice.

4th. In operating by the ordinary method on a soft cataract the operation may frequently be imperfect, because fragments of the torn membrane, charged with opaque portions of the lens, may obstruct the pupil and oppose the same obstacle to the rays of light as the entire cataract. By my method I have removed soft cataracts, I have extracted some which resembled hyaloids, and have detached others which were adherent.

5th. To depress a cataract by the old method, it was necessary to traverse the vitreous humor and to disturb the cells, which were sometimes torn by the more or less repeated movements of the needle, a condition which was not without serious consequences, and which could not be avoided even by employing a needle with neither point nor sharp blade. It is easy to see that this accident cannot occur in my method.

! I think that I have said enough to prove the excellence of this method and the preference which it deserves over the others. It has had the commendation of the masters of the art before whom I have operated, and several have already adopted it. It only remains for me to prove that I am the inventor of this operation, of which it would seem (for what motive I know not) that some would dispute its discovery with me.

The ancients all supposed that cataract was a membrane formed in the anterior chamber from the aqueous humor. It was not until 1656, as I stated at the beginning of this memoir, that it was recognized that cataract consisted of an opacity of the lens. It is, then, of no avail to search these authors for a method of extracting the cataractous lens.

The objection might be made that the ancients, while believing in the membranous cataract, had imagined extraction of the membrane, and that this was proved by the works of several Arabian authors, such as Avicenne and Rhazes. It is not difficult to reply to this argument.

1st. If it is supposed that this operation had been performed, it would only be the membranous cataract which was the object of it, and that will in no way detract from the merit of extraction of the lens, which presents very different ideas.

2d. While admitting the passage of Avicenne, which Dr. Thurant, Bachelor of Medicine of the Faculty of Paris, quotes in his thesis on extraction of the lens, presented in 1752, nothing can be found which detracts from the merit of the invention. The following is the text of Avicenne : *Et homines vias habent diversas in exercendo curam aquae, quas fit cum instrumento, ita ut quidem sint, qui disruptant inferiorem partem corneae. Et extrahant aquam per eam; Ethoc est in quo est timor, quoniam cum aqua quando est grossa, egreditur humor albugineus.* Dr. Thurant then remarks : *Aqua apud Avicennam idem est ac suffusio, hypochyma. Grossam dicit cataractam duriorem.* But on examining this text no description of a cataract, such as we know it, is found, and even if I should admit that Avicenne had intended to speak of the cataractous lens and its extraction, has he told us how the operation is performed ? Would not the glory of having renewed it and published the methods of performing it be mine ?

No greater importance is to be given to the testimony of authors who have spoken of extraction of a cataract ; I know of but two, Drs. Freitag and Heister.

The first only had in view a membranous cataract, and he has been sufficiently refuted by Dr. Heister, who doubts his operation. The second (Dr. Heister) states in his "Surgery," Part II., Section 2, Chapter LV., p. 578, that it had been reported to him that Dr. Taylor, an English oculist, had claimed, *gloriatum esse*, that he was able to remove cataracts adherent behind the uvea by a wound in the cornea. But Dr. Heister adds nothing more, and only gives to the public a hearsay and a possibility. It is true that Dr. Thurant adds to this statement of Dr. Heister that Dr. Taylor had really performed this operation several times in the year 1737, but I think that this is a gratuitous allegation, and I think that I can prove it.

Dr. Taylor, while at Vienna, in Austria, in 1750, operated in the presence of the celebrated Dr. van Swieten, a member of this Academy, and one could not suppose that Dr. Taylor would leave him in ignorance of the particular operations which he had performed, and would certainly have informed Dr. van Swieten of them. Nevertheless, in a letter written in 1751, in response to one which Dr. de Vermale had written to him, sending him a copy of his dissertation, not only does he make no mention of Dr. Taylor, but after stating that by following my method many inconveniences are avoided, he adds the following: "The only difficulty is in making the lens come out, especially when it is of a large size and quite firm, for it would seem to me that then it is necessary to injure the iris. The same is true of people who have a very small and undilatable pupillary orifice. However, the many successful results of an operation always make the difficulties which are opposed to it vanish, and a skilful hand accomplishes many things which would seem very difficult to others." If Dr. van Swieten had seen Dr. Taylor or any one else perform this operation he would not have given such a precise reply.

This great physician is not the only one who has granted me the honor of this method; I should also favorably mention Dr. Welken, Physician to S. A. S. the Elector Palatine, and the testimony of Dr. Mauchard, Professor of Medicine at Tübingen, Physician-in-Chief to the Duke of Wurtemberg, and unquestionably the most famous oculist in all Germany.

I await from the public the justice which I have a right to expect, and believe that I can do no better than to intrust my discovery to the academy.

In closing, I may say that this memoir is properly speaking only

an extract of what I hope to publish on this subject in a complete treatise on the diseases of the eye.

Remarks on Dr. Daviel's Memoir.

It was natural that the Academy was interested in the success of Dr. Daviel's method. Investigations were therefore made, the object of the first of which was the operations that he had performed at Rheims, 43 in number, in November, 1751. For this purpose they addressed Dr. Caqué, one of their correspondents, living at Rheims, who, in a letter dated January 15, 1753, replied that he could not give information of all of Dr. Daviel's patients, as some of them were not then in the city.

From the examination which he made of 34 of these operations, he found that 17 had succeeded perfectly. There were 8 where success was only moderate, and 9 which were followed by loss of vision. Of this number, six of the eyes operated upon had inelastic pupils, and in two there were staphylomas which had disappeared little by little.

Dr. Garangeot assured the Academy that he had successfully performed this operation on a soldier's eye. He had used a lancet and scissors for making the incision in the cornea, and a spoon to disengage the upper part of the lens.

It was believed that this operation was too valuable to neglect anything which might perfect it. Objection was made to the great number of instruments employed by Dr. Daviel for sectioning the cornea, for he employed four successively, which greatly lengthened the operation. Dr. Palucci, Surgeon to Their Imperial Majesties, proposed making the incision with a single instrument (1). Dr. La Faye presented an instrument to the Academy which is seen in *Pl. XX. (Fig. K)*; it is a bistoury fixed to a handle, with a very thin blade, pointed at the extremity, sharp on one side, blunt on the other, and curved on the flat. He claims that on account of this curvature an instrument is necessary for each eye.

After that, Dr. Poyet, surgical interne of the Hotel-Dieu, at Paris, presented another composed of a blade in the form of a serpent's tongue, about two inches long, sharp on both sides for half its length, and a short distance from the point pierced with an opening to receive a thread. This blade is carefully fastened in a handle of equal length. The following is the author's method of procedure: The instrument, provided with its thread, is held with the thumb of

(1) See "*Methode d'abattre la cataracte*," p. 160.

the right hand on one side, and the index and middle finger on the other, and is held horizontally near the outer angle of the eye in the transparent cornea, half a line from the conjunctiva, while with the thumb and index finger of the other hand slight support is given to the inner angle. Thus it is inserted through the cornea from one side to the other, at an equal distance from the iris and the conjunctiva. On arriving at the inner angle the thread is disengaged from the instrument with a small hook, which it is not necessary to illustrate, as it is easily understood. Then seizing the two ends of the thread, a loop is formed which, while supporting the eyeball, prevents it from following the alternate movement which one is obliged to make with the instrument for incising the lower part of the cornea. Hence it may be seen that with an eye thus supported and fixed the operation is surely and promptly terminated without the necessity of employing so many instruments. By this method one may also operate on both eyes with the right hand by standing at the side of or behind the head of the patient.

If after section of the cornea, which should include about two-thirds of its extent, a slight compression of the eyeball is not sufficient to cause the lens to escape, the cornea may be raised with the thread without the necessity of employing Dr. Daviel's instrument to maintain it in this position, while the membrane is incised with the point of the same instrument.

This instrument tried on cadavers has seemed to be singularly good. Dr. Morand has offered to obtain subjects for its use on the living. Dr. La Faye's method will also be tried, and one will be better able to judge of their merits.

Philosophical Transactions, Vol. XLVII., for the Years 1751 and 1752, p. 530.

Extracts of two letters of Thomas Hope, M.D., to John Clephane, M.D., F.R.S., concerning Monsieur Daviel's method of couching a cataract:

Read Nov. 16, 1752. Since I received your last, I had heard of a new method of performing the operation for the cure of the cataract, but did not care to say anything of it until I had seen it myself, and had inquired into the success of it. Mr. Daviel, a surgeon of this place, was the first who, in 1745, began to put it in practice, and has at last brought it to perfection; of which he has given a memoir to the Academy of Sciences of 115 operations, 100 of which have succeeded. A few days ago I saw him perform it on two persons, of which take following description:

After having placed the patient in a right light in a chair, he places himself over-against, and somewhat higher than the patient: an assistant holds the head steady, another keeps the upper eyelid open; he, with his left hand, keeps open the lower eyelid. Then he takes an instrument like a lancet, of a myrtleform point, a little crooked upwards, and fixed in a handle, and, making the patient look upwards, he pierces the *cornea transparens* at its lower circumference, just where it joins the *sclerotica*, conveys the point of the instrument between the *cornea* and *iris* upwards, beyond the pupil; he enlarges this opening on each side by the same instrument: he then takes out this instrument and introduces another of the shape of a narrow lancet, made round at the point, fixed in a handle: with the cutting sides of this he enlarges the opening. Taking out this, he introduces a pair of crooked scissars, enlarges the opening on each side by different snips, always as near as he can to the circumference of the *cornea transparens*, until he has made the opening round two-thirds of the *cornea transparens*. He then takes out the scissars, and, with a small instrument like an ear-picker, he raises the *cornea*, and having in his right hand a cataract-needle, broader and stronger than the common, and pointed like a lancet, he cuts the *capsula* of the crystalline thro' the pupil; then, pressing gently the globe of the eye with his finger from below upwards, the crystalline flips out of the *capsula* and drops out of the eye.

Upon the first puncture, the aqueous humor coming out, the *cornea* and *iris* join together: and it requires great dexterity, and a very steady hand, to introduce the instruments so as not to wound the *iris*, which would endanger the eye.

Tho' the operation lasted above two minutes, the patient, to my great surprise, never complained of any pain; and, upon my asking him, he said he felt nothing but a tickling. By which it appears the *cornea* is not much more sensible than the nail of one's finger. And this operation, which seems so cruel to a by-stander, does not give so much pain as couching in the usual manner. It is to be preferr'd to couching in many respects. It may be performed at all times, and in all kinds of cataracts, whether they are come to maturity or not. Moreover, one avoids many inconveniences and accidents, which often baffled the success of the best operations; such as the rising again of the cataract, violent defluxions and inflammations which often destroyed the eye, the hurting of the vitreous humor, which seldom failed in couching, etc.

In both the operations which I saw the patient, immediately after, could distinguish all large objects in the room.

Read Dec. 11,
1752.

Paris, Sept. 25, 1752.

In regard to certain remarks made by the skilful in your letter, he (M. Daviel) says that he has found, by experience, that all those instruments are necessary : and as to the extent of the incision, he says that he seldom makes it above one-half of the circumference of the *cornea transparens* ; and that a smaller opening would not suffice to let the crystalline to flip out easily, the diameter of which, in general, not being above a line less than that of the *cornea*, and, in some cases, within half a line, insomuch that, in order to make it pass thro' the *pupilla*, he has been obliged to give a snip of the scissars to the *iris*, which, he assures me, is attended with no bad consequences.

In answer to what is said, that it has been practised before, and that Taylor formerly performed it, he endeavors to prove that it never was, excepting in cases where the crystalline had, by some accident, flip thro' the *pupilla* into the anterior chamber.

In regard to the operation, there is some mention made of it among the Arabians, as what they had heard of ; but the operation is not described particularly anywhere. One convincing reason that it never was carried into practice among the ancients is that, had they made the extraction of the cataracts, they must have found it to be the crystalline humor, and not remained in the error they have all fallen into, that the cataract was a membrane formed in the aqueous humor.

In regard to Taylor, he may have attempted, but never did carry it into practice ; else he would not have fail'd to have publish'd it in the numberless productions he has given. I know, that, in 1743, I follow'd him in Edinburgh for six months, where he performed above 100 operations of the cataract by couching ; but never once attempted this way, nor ever mention'd it but in the case, where the crystalline is lodged in the anterior chamber ; which operation has been described in many authors. So that I think Mr. Daviel may be truly said to be the first, who has brought this method into general practice for the cure of a cataract.

I think the greatest risk one runs in this operation is the pushing out of the humors of the iris thro' the opening, which forms a *staphyloma* ; and I find this has been the case in some of those that have failed ; and it is not easy to contrive a bandage upon that part, to make a compression equal to the resistance of the *cornea* before it was open'd.

I am, etc.

THO. HOPE.

In his memoir read before the Royal Academy of Surgery, November 16, 1752, Daviel commences by correcting the fundamental error which for centuries had dominated the nosography of cataract, the idea that cataract was formed by a membrane placed in front of the lens, which was supposed to be fluid in the living eye. This idea had prevented the conception of extraction, a conception which the discovery of the true nature of cataract (Lasnier, Brisseau, and Maitre Jean) had rendered possible. It passed through a preparatory period, extraction of the cataractous lens, dislocated into the anterior chamber (Pettit, Méry, and Daviel).

The history of cataract extraction presents at every step facts which show that these errors were difficult to uproot. The performance of one hundred extractions during the second half of the eighteenth century did not suffice to prevent a return to the notion of the membranous nature of cataracts, for the great Dupuytren stated in 1833 (*Répertoire général d'anat. et de physiol.*, Vol. II., deuxième trimestre et leçons orales, Vol. III., p. 287) that the frequency of membranous cataract in relation to ordinary cataract (that is to say, lens cataract) was in the proportion of 1 to 1 $\frac{1}{4}$.

Daviel's memoir rejects the old classification of cataracts according to their color and substitutes an eminently practical distinction: a true or good variety, and a false or bad variety.

"The true cataract is a complete or partial opacity of the lens, unaccompanied by other disease of the eye.

"The color of the lens has nothing to do with determining the good variety. It is necessary that the eye be otherwise healthy, that the pupil dilate a half, a third, or a quarter, and that the patient distinguish light from darkness."

The last part of Daviel's memoir contains a claim for priority in the performance of cataract operation by extraction of the lens. Posterity has justified Daviel, but has forgotten the originator of the idea of this operation, Méry, who, in 1707, was the first to propose extraction of the cataractous lens.

I refrain from commenting on the other parts of Daviel's memoir to consider briefly the "Remarks on Dr. Daviel's Memoir."

The bistouries for replacing Daviel's three instruments may be divided into two classes: those in which the blades were sharp on both sides and those which had a blunt back. It is impossible to make an incision greater than half the diameter of the cornea with an instrument with a blunt back when the section coincides with the junction of the cornea with the sclera. In order that the section be placed exactly in the line of junction, it is necessary that the section may be as extensive as possible, that the puncture and the counter-puncture be situated on a diameter of the cornea, and since the instrument only cuts on one side, it will section just one-half of the cornea. Among these instruments should be classed Beranger's knife (a large knife, the prototype of all the large cataract knives, whether convex or triangular) and La Faye's knife (prototype of the linear knife represented in Plate XX. of Vol. II. of the *Memoirs of the Royal Academy of Surgery*). These two surgeons sectioned the lower semi-circumference of the cornea. These instruments were invented and employed in 1752. The same period saw the development of Poyet's knife, "composed of a blade in the form of a serpent's tongue, about two inches long, sharp on both sides for half its length" (*Memoir*, Vol. II., p. 353, Vm., Pl. XX.). The instrument is straight, and measures two millimetres in width in the illustration. With this knife it was possible to make a section higher than half the diameter of the cornea.

All the changes in instruments for opening the eyeball to give issue to the cataractous lens invented since 1752 are only revivals or changes in detail of these forms. Not one of the authors whose names are now associated with these instruments is their real inventor. The large cataract knife, that of Beer included, are modifications of Beranger's knife, while the linear knife was employed in cataract extraction for the first time by Poyet.

The remarks on Daviel's memoir are scarcely friendly. All his colleagues attack the section of the cornea, which was, without doubt, too large and difficult of execution, demanding the successive use of four instruments. In diminishing the

extent of the incision and replacing Daviel's four instruments by a single one, his contemporaries undoubtedly improved his operative procedure. Daviel himself recognized this and diminished the extent of his incision. But their operative improvements ill concealed the desire to detract from Daviel's merit and to appropriate to themselves part of his invention.

Thomas Hope's first letter, without date, was read before the Royal Society of London on the same day that Daviel read his communication to the Academy of Surgery, November 16, 1752. It tells us that Daviel had read a paper on extraction of cataract before the Academy of Sciences before addressing the Academy of Surgery. No trace of this communication can be found in the memoirs of the Institute. Supposing that there had been an omission in the index, otherwise very complete and detailed, I searched in vain through the volumes of the memoirs of the Academy of Sciences for the years 1749, 1750, 1751, and 1752. The volume for the year 1751 contains, however, an extract from a brochure presented by Dr. Palucci, surgeon, Pensionnaire of S. M. Imperiale, Member of the Academy of Florence, and Correspondent of the Academy, entitled "*Methode d'abattre la cataracte*," which may explain to us why the communication of Daviel, a scientist unknown to the Academy of Sciences, was not judged worthy of being printed in the memoirs of the Institute. We will return to this later.

Thomas Hope's letter gives the number of extractions performed by Daviel up to the time when his communication was read before the Academy of Sciences: 115 operations, 100 of which were successful. This fact, as well as the date of the reading of Thomas Hope's letter, enables us to determine approximately the date of Daviel's communication to the Academy of Sciences. A short time before speaking of 206 operations before the Academy of Surgery, Daviel had performed 34 at Rheims. Before or after his journey to Rheims he had operated on a number of patients in the presence of Drs. le Dran, Morand, and La Faye ("Not long ago," says Daviel, on November 16, 1752). Palucci's communication to

the Academy of Sciences in 1751 does not mention Daviel's communication, but seems to refer to it without naming it. It would not be a great error to fix the date of Daviel's communication to the Institute at the end of the year 1750.

Chance, that great servant of investigators, may possibly some day bring to light the text of the memoir presented by Daviel to the Academy of Sciences. While awaiting this fortunate occurrence we may suppose that this memoir was but little different from the one which he read to the Academy of Surgery. When Thomas Hope, on September 25, 1752, addressed his second letter to John Clephan, Daviel had already reduced the extent of his incision. The illustrations and the text of the memoir read six weeks later continue to mention an incision embracing two-thirds of the corneal circumference. It would seem, then, that it had been written some time before, and that only the number of operations was changed. And is it not natural to suppose that Daviel presented his memoir, which had been passed over in silence by the Institute, to the Academy of Surgery?

Let us return to Palucci's book, "*Methode d'abattre la cataracte*," and the extract inserted in the Transactions of the Academy (1751, p. 77). It is divided into four parts. In the first the author considers the anatomy of the eye, the second is a dissertation on the nature of cataract which corresponds with Daviel's exposition, and the third part is devoted to depression.

"The last question which Dr. Palucci discusses," says the Transactions of the Institute, "is whether it would not be more advantageous to remove a cataract from the eye than to be content with depressing it. A cataractous lens can be of no further use, and it may occasion accidents. Would it not be a surer method to extract it than to leave it? There are certainly cases in which this operation should be performed, but it is subject to so many inconveniences that it should only be used in case of necessity. It is necessary to open the cornea, and the aqueous humor consequently escapes. In making this opening it is very difficult to avoid injury of the iris, which

is quite near, and this will lead to loss of the eye. It is almost impossible for the surgeon, who requires both his hands for operating, to support the eyeball properly. The eyeball must be subjected to considerable pressure, necessary to cause the lens to escape through the pupil, and this cannot take place without forced dilatation of the pupil, which frequently destroys its elasticity. In a word, this operation is subject to so many inconveniences that Dr. Palucci thinks that depression of the cataract is infinitely preferable. The success of his operations, which have been witnessed by several members of the Academy, justify such a decision on his part."

We thus see that the Academy of Sciences rejects cataract extraction without naming its inventor, to publicly espouse the cause of depression, and to give Palucci the most explicit professional sanction in its Transactions. These facts sufficiently explain the silence in regard to Daviel's communication.

Palucci did not long remain opposed to extraction. As soon as this operation and its inventor had attracted general attention, we see him ranged among the most zealous improvers of extraction.

There is a passage in Daviel's memoir which is very probably addressed to Palucci, without mentioning his name. Palucci states that lesion of the iris leads to loss of the eye. Daviel had from experience proved the small foundation for this fear, and explains it in the following manner: "If it should occur, from an injury to the iris, that blood escape into the anterior chamber, it flows out readily through the incision, and this is in no way a detriment to the operation. This accident occurred to me a short time ago, while performing the operation in the presence of Drs. le Dran, Morand, La Faye, and several others. The eye was no worse, and the patient sees as perfectly with it as with the other which was operated upon at the same time." Daviel might have said that he felt no hesitation in voluntarily making an incision of the iris, for at a former time, September 25, 1752, he had said to Thomas Hope, "in order to make it pass thro' the pupilla, he has been obliged

to give a snip of the scissars to the iris." This phrase is too poor in detail to decide whether this was an iridotomy or an iridectomy, but the essential fact is the proof of the innocuousness of operative wounds of the iris, a discovery which led to the method of iridectomy.

When the harmlessness of incisions and excisions of the iris tissue was recognized, Daviel did not hesitate to utilize this discovery in forming an artificial pupil. His writings show that he combined iridotomy and iridectomy with cataract extraction, but do not enable us to decide whether he performed the operation for artificial pupil without following it by lens extraction, and they give no details as to the method of operation used. The passage in question is found in a letter written by Daviel in 1761 to Baron Haller:

"I am well satisfied to see this patient leave Paris, and he has willingly undertaken to deliver this letter to you with a small drawing, somewhat curious, concerning a section of the iris which I was obliged to perform in the right eye of a patient. I removed half of this membrane in order to form an artificial pupil. This is not the only time that I have been obliged to remove the iris or to section it, and I have many observations to tell in this connection, and have never seen the slightest accident resulting from it."

The origin of operation for forming an artificial pupil is closely connected with the cataract operation. *Iridotomy*, performed for the first time by Cheselden, in 1728, was derived from depression of the lens. Thomas Woolhouse, to whom some authors attribute the invention of iridotomy, proposed separation of the iris adherent to the lens from the latter by a process similar to that which was employed by his pupil Cheselden for iridotomy. He introduced a needle similar to that which was employed for depression, but sharp on only one side, between the lens and the iris, in the same way as for depression through the sclera. Instead of directing the point backward, he transpierced the iris and cut its radial fibres. De Wenzel, Sr., was the first to recognize the great importance of excision of the tissue of the iris in forming an artificial pupil

and the advantage to be gained by the establishment of an artificial pupil. His ideas, explained by Dr. de Wenzel, Jr., in his "*manuel d'oculistique ou Dictionnaire ophtalmologique*" (Vol. I., p. 130), have been discussed by Demours and Desmarres. His operative procedure is directly related to a chance wound of the iris, as it had been observed in cataract extraction by Daviel. "Dr. de Wenzel introduces the point of a bistoury into the iris, half a line from the centre of this membrane, while he is incising the cornea, and brings it out about three-quarters of a line beyond the point where it enters. He then completes the incision of the cornea. The result of this movement is that a small flap of the iris, about a line in length and semicircular in form, is obtained, which he removes with scissors, and then proceeds to extract the lens, whether it is still transparent or not." (Demours: *Traité*, Vol. I., p. 544.)

Desmarres thinks that this operation may be performed without the necessity of removing the lens: "The patient is seated in the same manner as for the cataract operation. The keratotome is introduced into the cornea the same as for lens extraction. When the point has reached about half a line from the centre of the iris the instrument is introduced into this membrane for a depth of half a line, and by a slight movement of the hand backward it is brought out about three-quarters of a line from the place where it was introduced. Then, in completing the incision of the cornea, as in cataract operation, before this incision is terminated, the iris is cut, and presents a small flap about a line in width. This section of the iris is quite similar to that of the cornea, and is also semicircular. When the instrument has completed the section of the cornea small scissors are introduced into the opening into this membrane, and the flap of the iris is cut off, and thus an artificial pupil is obtained which is sometimes quite round, from the sudden and equal retraction of all the incised fibres. By this method the lens may be extracted at the same time if it is thought proper." (Desmarres: *Traité*, Vol. II., p. 539.)

Forlenze was the first to seize the iris and draw it out with small hooked forceps, after which he excised this portion.

This was evidently the transition to the modern iridectomy created by Desmarres. Beer, to whom some treatises attribute an important rôle in the creation of iridectomy, plays but a small part. He made a small incision in the limbus, in order to cut off a small tumor formed by prolapse of the iris. This method, inspired by the idea of preserving, is very restricted in its application, and is an involution from the method of Forlenze. It is impossible of execution in cases with extensive posterior synechiæ.

Since the use of cocaine, the passage of a cataract through the pupil presents no difficulty. But it seems that without local anæsthesia contraction of the iris sphincter may prevent the escape of the cataractous lens. Chavernac, Gailliet, and Charles Bell Taylor performed iridotomy combined with Daviel's incision during the decade which preceded the introduction of cocaine.

IN 1762 DAVIEL COMPLETELY MODIFIES THE FORM OF HIS INCISION.
ULTIMATE CONSEQUENCES OF THIS MODIFICATION.

After being faithful for seventeen years in regard to the extent, or at least to the form, of his incision, and the situation of the section, we see that Daviel, in 1762, proposed a fundamental change in the method of opening the eyeball. His communication to the Academy of Surgery which describes this change was not inserted in the memoirs of the Academy, and the *Mercur de France* of July, 1762, is now our principal source of information. A detailed description of an extraction made by Daviel's modified process, September 3, 1761, is found in the *Acta helvetica* for the year 1762. These documents have been published by Dr. de Wecker in the *Archives d'ophthalmologie*, Vol. XII., p. 413. It is there seen that Daviel at this time made a triangular flap, with a nasal or inferior base, situated entirely in the tissue of the cornea.

He gives the following reasons in justification of his abandonment of the semicircular incision, with section in the limbus: "The aqueous humor escapes at the beginning of the operation, the uveal membrane readily presents itself in the wound and produces a staphyloma which may lead to loss of the eye;

union of the wound is difficult, and sometimes the cicatrice is so thin that it will reopen on the slightest effort; hence, prolapse of the iris and consecutive loss of the eye."

It was, then, more particularly to avoid prolapse that Daviel changed the section which he had recommended in 1751 and 1752. The new section was not employed, but Daviel's effort, and especially his reason for it, had the effect of producing a modification of the semicircular section which remained for about a century. Instead of making the keratotomy coincide with the limbus, it was made in the cornea, about 1 millimetre from the limbus. Some operators give the section an oblique direction downward and outward. The details of this period which commences with the Desmours and the de Wenzels, and the last representative of which was Desmarres, Sr., will be the object of the second part of this essay.

THE RELATIVE IMPORTANCE OF LABYRINTHINE AND OCULAR DEFECTS IN THE ETIOLOGY OF VERTIGO

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The purpose of this paper is to discuss briefly the commonly accepted cause of the majority of cases of vertigo met with in practice, to examine its title to such a position, to draw a comparison between it and another cause, and, finally, to record a few cases of vertigo, with the treatment employed for their relief.

Ever since the interesting experiments of Flourens, Cyon, Crum-Brown, and others on the semicircular canals, and Ménière's report of his ten cases of vertigo, it has been generally held as settled beyond doubt that the cause of dizziness should, in the majority of cases, be found in the semicircular canals. Add to this the fact that cases of temporary dizziness arising from foreign bodies in the external auditory canal, pressure of cerumen on the membrana tympani, and rarely an otitis interna, are familiar to every one, and perhaps chief of all, the fact that

so many cases of vertigo are attended with tinnitus and nerve deafness, and it is not strange that, in spite of some objections, the profession should have been satisfied as to the correctness of the theory. Gowers says that in nine cases out of ten, giddiness is due to a morbid state of the labyrinth or auditory nerve endings, and gives as his reasons: that acute lesions of the labyrinth have caused violent vertigo; that progressive disease of the labyrinth may be attended with severe vertigo, which may cease when the progress of the disease has produced complete deafness; that in 105 consecutive cases of vertigo 94 had ear symptoms, tinnitus or deafness, or both, and always defective hearing through the bone, and that vertiginous movements result in animals from lesions of the semicircular canals.

On first thought, these would seem to be sufficient reasons. They are open to objections, however, even in theory. For instance, there are many cases of bone deafness in which there is no vertigo. There are a great many cases of vertigo of mild type in which careful examination will reveal no aural trouble. In the severe forms, in which, as stated, there is usually tinnitus or deafness, it is quite possible that the vertigo and the aural symptoms may arise from a common cause.

If we consider vertigo from a practical standpoint, we shall find those reasons far from satisfactory.

In the first place, the experiments on the semicircular canals can be held to have proved only that they are in intimate relation with the function of equilibration. Section of one or other canal will certainly produce a definite disturbance of equilibrium. Destruction of a horizontal canal will cause a turning around the vertical axis; destruction of the vertical canals will cause a turning around the horizontal axis forward or backward. On the other hand, precisely the same rotations occur if certain centres in the cerebellum are destroyed. Thus, a lesion of the anterior part of the middle lobe will cause a tendency to fall forward; a lesion of the middle and posterior parts will cause a tendency to fall backward, and a lesion

of the lateral lobe, or of the middle peduncle, will cause an animal to rotate on its longitudinal axis. As Ferrier says, "The results of direct irritation of the semicircular canals are essentially similar to those of direct irritation of the cerebellum itself in different regions." In the same manner, destructive lesions of the corpora quadrigemina are attended with profound disturbances of equilibrium very similar to general labyrinthine destruction.

Now, taking as granted that the movements mentioned above are attended with the subjective sensations commonly experienced by one suffering with vertigo, it is necessary to demonstrate that the labyrinth is frequently the seat of destructive lesion. This, however, is not found to be true. Even in Ménière's cases, which have been considered beyond dispute, Buzzard has shown that in but one of them did an autopsy reveal a labyrinthine lesion. Gross pathological changes in the labyrinth are exceedingly rare, and degenerative changes in the tract of the eighth nerve or in the auditory centres are no less so. In the degenerations of tabes, the auditory nerve lesions are least frequent, perhaps, of all peripheral nerves. With the large number of vertigos of severe type, and the more frequent cases of mild forms of vertigo, it would be natural to expect rather frequent post-mortem changes in the auditory nerve or centres.

Again, what similarity is there between the symptoms arising from lesions of the semicircular canals and the symptoms of vertigo as we meet it in practice? In the former, definite movements of the animal occur; in the latter, the predominant symptoms are subjective sensations of whirling, falling, and the like. Rarely even in the most severe forms of vertigo do we find movements that remotely suggest the gyrations of an animal with wounded semicircular canals. When they do occur, they are usually accompanied with unconsciousness.

The chief point of difference, however, is in the duration of the symptoms. Lesion of the canals produces effects that are continuous while they last; while in marked contrast to

this the symptoms of vertigo are habitually paroxysmal. Too much stress cannot be laid on this characteristic of vertigo in searching for a rational cause. In this connection it will be well to remember that the auditory symptoms proper, tinnitus and deafness, are also continuous, and it is difficult to imagine an irritation that could steadily act on the cochlear branch of the auditory nerve and affect the labyrinthine branch only at intervals. If there were no other objections, this would be sufficient of itself to throw discredit on the labyrinthine theory.

If the experiments on the semicircular canals have proved anything, it is that the vertigos with which we are most familiar cannot be caused by labyrinthine irritation.

That the theory has not proved wholly satisfactory to the profession is evidenced from the fact that certain observers have drifted away from the position originally held, and, while stoutly maintaining the importance of the part played by the semicircular canal, have located the irritating lesion at a distance. Thus, Woakes regards sclerosis of the vertebral artery as the cause of vertigo and the phenomena associated with it. Buzzard, in an "Address on Vertigo of Bulbar Origin" (London *Lancet*, 1890, I., 179), says: "Paroxysms of vertigo in persons of previously fair health are commonly ascribed to diseases of the labyrinth, but my impression has long been that, in a large number, perhaps a majority, of cases of auditory nerve vertigo, it is through its centre and the medulla oblongata that the nerve is affected, and not at its periphery," and concludes by saying that "we must often look to something in the bulb itself for the explanation of vertigo with auditory symptoms and allied disorders of function in the district of bulbar nerves. What that something is, I cannot pretend to say. It may be uric acid salt, or possibly some other product of disturbed metabolism."

In other words, we must look for a cause that would rationally come into play more frequently and periodically than labyrinthine irritations.

As long as the function of equilibration has been studied, it has been held that the chief factors engaged are a co-ordinating centre, the cerebellum, and sensory impressions emanating from the visual, the auditory, and the muscular apparatus. Of the latter, the chief source of information is through the visual organs. Gowers says: "The knowledge of the relation of external objects to the body gained from the contraction (*i. e.*, the innervation) of the eyeball muscles is one of the most important sources of guidance to the centres that regulate the muscular contractions for maintaining the equilibrium of the body." This is not putting it stronger than would the most conservative physiologist. It seems rather strange, therefore, that in the study of an anomaly of equilibration the first and most persistent thought should not have been given to the visual apparatus. Here was a pair of organs whose business it was, to say the least, to convey impressions of the relations of external objects located at all sorts of distances, limited only by the horizon, as against the tactile and muscular senses, which would convey impressions only of objects in actual contact with the body, and of the auditory sense, which would gain information of direction only through the aid of the visual and tactile senses, and for limited distances. And yet, when there is an apparent disturbance in the stability of external objects, or a subjective sense of confusion, the visual organs fall into the background, and the only thing remembered is that lesions of the semicircular canals cause a disturbance of equilibrium.

Physiologists of to-day are pretty well agreed that the ocular form of vertigo is a rare one. Gowers distinctly asserts it, and passes over the subject with a few words regarding the vertigo attending the paralysis of ocular muscles. Ferrier is more guarded, but says: "In all these cases of ocular vertigo the subjective element plays an important part, and it is difficult to determine how much, if any, disturbance of equilibrium would result from interference with the eyes or ocular muscles in the

absence of true sensation, and apart from organized associations."

Dr. George T. Stevens was the first who taught that vertigo could be due to other ocular defects than paralysis. Thus, in his "Functional Nervous Diseases" vertigo is mentioned as one of the symptoms of eye strain, and those who have been closely associated with him know that for many years he has held, and in his practice established the fact, that vertigo is habitually due to oculo-muscular defects. In a paper read at the International Medical Congress, London, in 1880, the same author shows that the symptoms of aural vertigo, tinnitus and deafness, are frequently due to esophoria. What follows must therefore be regarded, not as original, but as confirming the teachings of Dr. Stevens. There seems the more necessity for such a paper, since those few men who have reported cases of vertigo due to heterophoria, among whom may be mentioned Stirling, Davidson, and Heath, have in the main regarded those cases as exceptional, and not important as representing a principle.

In order theoretically to establish the relation of a cause to an effect, it is necessary to define the effect and then demonstrate the existence of a cause equal and similar to that effect. So if we would judge of the relation of the visual apparatus to vertigo, we must proceed in the same manner. "Vertigo," according to Quain, "is a consciousness of a disturbance of equilibration." The names given to all the different varieties into which vertigo has been divided do not add to the definition. It is sufficient to know that it may be attended with a variety of symptoms, chief among which are auditory and gastric disturbances. It occurs in attacks at irregular intervals. Vertigo is a prevalent disorder, and, in fact, there is little doubt that the majority of persons, at some time in their lives, suffer from one form or another. In the mild types, it is as common in children as in adults, the more severe types being reserved for the latter. It varies from a slight unsteadiness

ness of objects, a slight miscalculation in walking, up through the different stages of subjective and objective confusion, to the typical attack with the most profound disturbance of sensation and equilibrium. There is the vertigo that occurs on suddenly rising from a stooping posture, the vertigo that occurs only in the presence of rapidly moving objects, or when standing on a height, the dizziness of a railway train, and that of seasickness; vertigo from different positions of the body, as when the head is thrown back, or when lying down. In addition to these, there is one form of vertigo of common occurrence, especially in youth, which, as far as I know, has not been mentioned as a type, and that is the vertigo of sleep. These cases are in the habit of dreaming that they are climbing some difficult ascent, and, having reached a point of danger, fall, and continue to fall until they awake. Another form is one in which the dreamer imagines himself swinging around a room at increasing velocity. It is interesting to note in passing that there is some suggestion of similarity between these cases and those of nocturnal epilepsy. It will be seen that, of all the varieties of vertigo mentioned, very few would be considered of sufficient importance to require treatment. That they exist all about us, however, is not to be denied, and in the study of the etiology of vertigo they are of much importance.

Now, as to the visual apparatus. Beyond the passive reception of visual impressions, in which each eye is a photographic camera, we have here a pair of organs which, in an ideal condition, are so accurately adjusted by means of twelve muscles, and so delicately co-ordinated through centres in the brain, that they are capable of the most rapid and complicated movements in perfect harmony. The active function of this complicated mechanism is to preserve identity in the visual impressions received on the two sides, but chiefly to convey to the brain impressions of direction and relative position of external objects. This is determined by the effort required to converge the eyes on the different points in the field of vision. So long

as the co-ordination of the muscles exists, the impressions conveyed are single and definite; when, for any reason, co-ordination is not perfect, the impressions conveyed are not single, and the judgments formed of position are erroneous.

Imagine a child to be born in whom all these ocular muscles are anatomically of such relative length that when no unequal contraction is made the visual lines are parallel. Imagine also the eyes to be emmetropic. An ideal mechanism will then exist for learning the complicated movements required for the preservation of binocular seeing in all parts of the field of vision, and in all positions of the body. With the aid of vision and of the co-ordinating centres in the brain, the muscles will soon acquire the faculty of associated action, and there will be established a constant relation between the position of the eyes with reference to each other and the position of external objects, including the plane of the horizon. Once acquired, this relation is always maintained, and we shall have a pair of organs whose sphere of action is entirely independent of the movements of the body. It will readily be seen, therefore, that whereas, originally, the eyes have received instruction from the co-ordinating centres in the brain, they in turn become the most important guides in the maintenance of the equilibrium of the body, not so much through visual sensation as through the muscular sensations arising from the concerted action of the oculo-motor apparatus. It follows that, whether the eyes are open or closed, in the light or in the dark, awake or asleep, the centres are kept informed of the relation of the body to the plane of the horizon with the same exactness as the ship is guided by the compass. In the case assumed of a natural mechanical balance of the ocular muscles, loss of equilibrium would not in ordinary circumstances occur.

In the human race as we find it to-day, however, such perfection of the ocular apparatus is exceedingly rare. The degree of defect found in different cases is as great as the prevalence of those defects. Our clinics are full of cases of marked strabismus, whether they come for the correction of those faults or

not. There come many others in whom no such defect is manifest. Is it to be supposed that there are born two classes, one with gross defects, the other without? Not at all. As a matter of fact, we should expect to find, and we do find, every degree of defect between these extremes. In the higher grades, there is no effort at correction, simply because the images are too widely separated to be confusing; but as parallelism is approached the necessity of binocular vision becomes paramount, and the diplopia is overcome by tension on the necessary muscles.

It is with the latter cases that we are here concerned. The maintenance of equilibrium is evidently dependent on an excessive contraction of one or more of the ocular muscles. For these muscles there is no rest, and the result is that the equilibrium of the eyes is unstable. It will not be difficult to anticipate that the time will come when that tension will not be perfectly maintained. The eyes will slip off into their natural positions, perhaps only for an instant, and confusion will reign until they can be brought again to parallelism. The frequency of such lapses will depend on the amount and character of the original defect, the general health, and the flexibility or stiffness of the muscles, as determined by age.

Take, for example, a case in which one visual line is directed several degrees above its fellow; it is to be expected that in infancy there will be some difficulty in learning habitual co-ordination of the ocular muscles. Having learned their lesson, there will be frequent failures to preserve that relation: perhaps when the eyes are closed in sleep, all the muscles of the body relaxed, and the visual function removed; perhaps in the presence of objects in constant motion, where rapid readjustments are necessary; perhaps, above all, when age has reduced the flexibility of the muscles so that a balance that is readily maintained in youth is rendered more and more difficult. Whenever a failure occurs, there will be a disturbance of equilibrium lasting until a readjustment is effected, and profound in proportion to the existing defect.

That there are a large number of persons who habitually maintain binocular vision with ocular defects more complicated than that just mentioned no one who has long made a practice of measuring those defects and correcting them by surgical procedure will deny.

Here we have, then, on the one hand, a prevalent defect capable at any time of producing a disturbance of equilibrium, and, on the other hand, a disorder occurring at irregular intervals, and increasing in frequency and severity with age. One cannot but be struck with the similarity in the two conditions, and suspect a relation between them of cause and effect.

It remains for us to record a few cases in which attention has been directed to the correction of ocular defects, which will serve as illustrations. The first case to which I shall call your attention is so typical of what is usually diagnosed as labyrinthine vertigo that I may be pardoned if I give it somewhat in detail.

Case I.—Mr. C. R.—, aged fifty-six, consulted me July 17, 1888, for intense vertigo and roaring in the head. His history was as follows: At the age of ten had scarlet fever, which caused an obliteration of the tympanic cavity in the right ear, with total deafness to ordinary sounds in that ear and reduced hearing in the left ear. From that time has had continual tinnitus—a ringing, or a singing, as of crickets. As a child, could never look at a lighted lamp or a public speaker without having a confused feeling and observing a slight dancing of objects, so that he was compelled every now and then to look away for a moment. These symptoms became more common until about the age of twenty-one, when he began to have vertigo at night. This usually happened when lying on the right side, but sometimes, also, when lying on the left. Could not lie down without a continuous feeling as though something were turning over and over in his head, and was obliged to change his position for relief. From this time, could never lie back in a barber's chair without feeling that he was going heels over head. At forty, began to have, in addition to these symptoms, occasional attacks of rush of blood to the head, and a momentary whirling of objects, attended by nausea and vomiting. At fifty-five, was suddenly seized with intense vertigo, subjective and objective swimming and whirling, great weakness, and staggering. The tinnitus increased from

a ringing to a great roaring, resembling a rushing train of cars, or a storm in the forest. This attack lasted three or four hours. In about ten days, had another, lasting from six to twelve hours. The attacks increased in frequency until, at the time he came to New York, he was having one a week. He now walks with a slightly staggering gait, his face is pale, and wears an anxious frown. Places his hand to his ear to hear distinctly. Right ear cannot hear watch on pressure. H. D. left $\frac{1}{4}$. Tuning fork heard with difficulty through the air with right, better through bone. Air and bone conduction for left equally reduced. Obliteration of right tympanic cavity. Thickening of membrane in left. Vision —O. D. $\frac{1}{2}$ Spher. + 2.25., O. S. $\frac{1}{2}$ Spher. + 2.50. Ophthalmoscope shows slight choroiditis at both maculae. A well developed pterygium at the inner edge of the cornea of each eye, with general congestion of the ocular conjunctiva. Examination of the ocular muscles reveals an esophoria of 3° only, but with an abduction of 1° . With red glass before one eye, has always homonymous diplopia, from 3° to 6° . The muscles are very stiff, so that they are unable to make but slight excursions in any direction, especially when looking up. Examinations were repeated on three successive days, and the esophoria having settled at 5° , on July 19 a tenotomy of the right internus was made, resulting in esophoria zero, and abduction 7° . No diplopia with red glass. The result was magical. When he called the following day all the roaring in his head had ceased, the constant confusion was gone, and the appetite had returned. He continued to improve so fast that, his tests remaining just as they were after the operation, he was dismissed on July 26. For four years he was entirely free from any sign of vertigo, or roaring in the head. The ringing continued, but the hearing improved, so that he hears the watch now with the left ear at fifteen inches. In 1892 he came again to New York because of a slight return of his vertigo. Some esophoria was found and corrected by tenotomy of the left internus. Before the other faults found at the first examination could be corrected, he was called home by the illness of his wife. He, however, had no trouble until January of this year, when he returned, as he said, to finish the work. The symptoms were slight in character, the chief being a dizziness when lying back in a barber's chair. It was found that there was parallelism of the visual lines, but that the power of the upward rotation of the eyes was extremely limited, while the downward rotation was excessive. This was corrected with immediate relief of all symptoms. The eyes have now acquired great freedom

of action; there is orthophoria, the patient's face has, for the first time, assumed a perfectly comfortable expression, and no return of the vertigo is to be expected.

Case II.—R. N——, a boy aged eight, was brought in by his parents to learn whether anything could be done to restore his sight. Complete atrophy of both optic nerves was found. This child had suffered all his life from attacks of dizziness and vomiting, until his sight was gone. Since then he has been perfectly well.

Case III.—J. L. V——, aged twenty-eight, April 6, 1891. For past two months has had repeated sensations of confusion in his head, culminating two weeks ago in an attack from which he fell unconscious in the street. While unconscious there was twitching in his right leg. Has constant pain in his back and in the top of his head. Is troubled with insomnia. Vision $\frac{1}{2}$ each, with cyl. +.75—180°, which he had been using before consulting me. Has also exophoria 12°, abduction 15°. Has ordinarily binocular vision, but with red glass has crossed diplopia. On April 6, 1891, a tenotomy of the left externus was done, and on April 27, tenotomy of the right externus, resulting in orthophoria and abduction 7°. The first operation corrected the diplopia with the red glass, the patient lost his insomnia, the pain in his head was less, and the confusion much reduced. After the correction of the remainder of the exophoria he was relieved of all unpleasant symptoms, and returned to work at bookkeeping. He wrote some months afterwards that he had remained perfectly well, and, as far as I know, has had no trouble since.

Case IV.—Mr. H. H. C——, aged thirty-two. For the past year has been very nervous, irritable, and melancholic. Has a great deal of dyspepsia, and is constipated. Is much troubled with mental confusion, and after his meals is subject to attacks from which he momentarily loses the thread of thought. Has emmetropia, esophoria 9°. Correction of this by two operations resulted in orthophoria and abduction 8°. The patient was relieved of the attacks of confusion, and much of his dyspeptic symptoms, became cheerful, and returned to work. This was in 1891. In answer to my inquiry, not long since, he assures me that he has continued well, except for his dyspepsia, which still troubles him.

Case V.—Mr. T. P. M——, aged forty-three, October 8, 1888. For five years has had vertigo, but during the past two years the attacks have occurred most frequently. During that time has had, on an average, one attack a day. Sometimes has three or four a day. Sometimes passes a day or two without any. In these attacks he

falls down, usually backward, and everything appears to move irregularly. Buildings go down in a zigzag fashion, as though swallowed by an earthquake. At night, his bed appears to turn head upward and to revolve. On rising in the morning he sometimes falls back in bed. The attacks of vertigo last but a minute or two, but may leave him dizzy for an hour. He is a large man, with full, fleshy face, and features much distorted, as if standing in a strong glare of light. Right ear hears watch on pressure. Left ear $\frac{1}{2}$. He thinks that right ear became suddenly deaf eight years ago. Right hyperphoria, 1° to 2° , esophoria 5° , abduction 12° . On prescribing a prism for 1° right hyperphoria the attacks of vertigo immediately ceased, and he was free from them for three months. As the actual amount of hyperphoria was uncertain, no correction by operation was resorted to, so that about once a year he found it necessary to make some slight change in the prismatic correction of the heterophoria. Two years ago, however, the exophoria was corrected by operation, and since then, with the use of the prism for right hyperphoria, he has had no return of his dizziness, although steadily at work at bricklaying.

Case VI.—Mr. T. B. Van V——, aged fifty-four. Has suffered for many years with chronic dyspepsia accompanied with frequent attacks of vertigo. Vision—O. D. $\frac{1}{2}$ C.2.50 20° . O. S. $\frac{1}{2}$; rejects glass. Left hyperphoria 1° , esophoria 6° , abduction 1° . The use of the proper refraction glass was attended with some relief. July 1, 1890, the esophoria was relieved by a tenotomy, with further relief to the symptoms. December 2, 1890, the hyperphoria was corrected, leaving hyperphoria 0, exophoria $\frac{1}{2}^{\circ}$, abduction $7^{\circ}+$. His last report, in June, 1891, was to the effect that he was not only rid of the vertigo, but also the dyspepsia and headaches, and was a new man.

Case VII.—Mrs. O. E. B——, aged thirty, June 10, 1892. For past two years has had great confusion in the head. Cannot go to a public place without an attack of vertigo. Memory poor. Suffers from melancholia. Is continually in tears. No aural symptoms. Right hyperphoria 2° , esophoria 12° , abduction $0-1^{\circ}$. June 11, tenotomy of the right internus. June 14, tenotomy of the left internus. Experienced immediate relief from all her dizziness. Returned September, 1893, and reported that there had been no return of the vertigo; that she could go to any public entertainment without trouble, and that she is much more cheerful. She is, however, very nervous, and has fits of maniacal excitability. A correction of the right hyperphoria and a little remaining esophoria resulted in

orthophoria and abduction 8° , with permanent relief to the remaining symptoms. A year later, her husband reports that she is perfectly well.

Case VIII.—Mr. R. N. C——, aged thirty-nine, September 27, 1892. Eighteen months ago, began to have trouble when walking in the street. Suddenly, one or both legs would feel weak. This sensation was accompanied with dull or lancinating pains in thigh, extending thence to the stomach, causing nausea, and from there on to the head, which would become more or less confused for a moment or two. All sensations would then pass away, leaving him perfectly well. He never lost consciousness. The attacks increased in frequency until, when he consulted me, they occurred nearly every day. Vision $\frac{1}{2}$ each. Right hyperphoria 4° . Tenotomy of the right superior rectus resulted in a permanent relief of the vertigo. His last report was in January, 1894, to the effect that he had had no return of the trouble.

Case IX.—Mr. W. J. C——, aged twenty, April 4, 1893. Has constant headaches and a great deal of dizziness. Has dizzy sensations lasting several days. Again, has sudden attacks in which he would fall did he not lean for support on something. Ocular conditions: Left hyperphoria 3° , esophoria 7° , abduction 12° . Tenotomy superior rectus left eye, tenotomy of each externus, then hyperphoria, esophoria, and exophoria 0, abduction 5° , with permanent relief to all of his symptoms.

Case X.—Mr. B. A——, aged twenty-five, September, 1889. Neurasthenic. Has had occasional slight vertiginous sensations during the day, but is chiefly troubled at night in his dreams. From boyhood, whenever particularly fatigued, has at night had a dream in which, in addition to other unpleasant features, he has seemed to toil up some height and to fall until he awoke. These dreams were so troublesome as to make them a matter of mention. He showed esophoria 5° , abduction 1° , hyperphoria 0. Homon. diplopia with red glass. Tenotomy of the right internus resulted in single vision with the red glass and a partial relief of the neurasthenic symptoms, and the patient observed that he no longer had unpleasant dreams, or dreams of falling. An interesting thing to note is that subsequently a tenotomy of the left internus was made with an over-correction of the esophoria and a restriction in the inward rotation of that eye. It was left for some months, with the thought that there was latent esophoria, and that it would adjust itself. This proved erroneous, and the rotation was ultimately restored by bringing the tendon slightly forward with a suture. During the time of the restricted

rotation, the patient assured me that he began to have dreams again, but instead of falling sensations, he seemed to be swinging around a room, or flying. When the correction was made, these dreams ceased, and when he was seen not long ago, he assured me that he had not had one of that nature since.

These cases have been taken at random from my records, with no further selection than the omission of those in which the vertigo has played an insignificant part, or, through carelessness, failed to be properly recorded. For the sake of brevity, all the details of the work, all the difficulty in arriving at the ocular conditions the correction of which resulted in orthophoria, and therefore relief to the vertigo, have been omitted. As much as possible, technical terms have been avoided, but no one will fail to recognize in the description of each case some well-known variety of vertigo.

In conclusion, it will be of interest to remember that heretofore the prognosis in cases of vertigo has habitually been unfavorable. Treatment directed to the aural defects, when found, has been at times to increase the hearing and decrease the tinnitus, but, however successful in this, it has, as a rule, had little effect on the vertigo.

On the other hand, the results in the cases mentioned above have been as gratifying as could be expected. Indeed, the prognosis is habitually favorable. It must not be supposed, however, that the correction of vertigo is a simple matter. On the contrary, it requires a deal of patience and study to arrive at the true ocular conditions, and having found them, as much skill in correcting them. Perhaps the majority of cases will, at the first examination, present orthophoria tests. Yet those cases have really much defect. In the same manner, an over-correction may be immediately adjusted by the patient, who will temporarily show orthophoria, but there will have been produced a far greater cause for vertigo than the original defect.

If this paper has aided in directing thought into a channel profitable for the relief of the many who suffer from the different forms of vertigo, it will have fulfilled its purpose.

33 WEST THIRTY-THIRD STREET.

A NEW METHOD FOR FORMING ARTIFICIAL PUPIL BY EXTERNAL IRITOMY

By **FELIX LAGRANGE**,

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Artificial pupil may be formed for various conditions, which may be classified under two principal heads: 1st, the lens has been removed, and there is a more or less complete secondary cataract; 2d, the lens is in its normal place.

I wish to consider the formation of artificial pupil only in the second case.

This operation, to permit luminous rays to penetrate the eye through excentric parts of the dioptric system, frequently gives but mediocre results, on account of the corneal astigmatism, so marked in cases of old keratitis and of spherical aberration.

These optical defects of the cornea and the peripheral portions of the lens are the more noticeable as the surgical coloboma is the more extensive, and almost always the fault of an artificial pupil is that the opening is too large. All ophthalmologists, recognizing the utility of small pupils, endeavor to limit optical iridectomy to the smallest extent; but rarely, possibly never, do they obtain the desired size.

Iritomy, only in not causing any loss of substance, is able to produce the maximum effect of utility. It places the artificial pupil under the advantageous conditions of the stenopaic window.

I shall say nothing new by calling attention to the advantages of iritomy. Janin (1) has already emphasized the value of this operation, but only in case the lens is absent, "on the other hand, it will be necessary," he says, "to devise an operation in which there will be no danger of injuring the lens with the instrument, without which the operation would be imperfect, or rather harmful."

In zonular cataract Bowman at the London Congress 1873 proposed as a substitute for iridectomy iritomy by incising the circu-

(1) JANIN : *Mémoires et observations anatomiques, physiologiques et physiques sur l'œil et sur les maladies qui affectent cet organe.* Lyon et Paris, 1772, p. 190.

lar fibres of the sphincter of the iris. To accomplish this he introduced a very fine lance-shaped knife at about the middle of the radius of the cornea which corresponds to the horizontal diameter of this membrane. The opening should be large enough to give passage to a small blunt knife 1 millimetre broad, which is introduced on the flat across the field of the pupil and under the border opposite the section. The blunt point of the knife being then between the iris and the lens and near the insertion of the iris, the operator turns the blade of the instrument forward, and by a combined movement of traction and pressure he sections the sphincter of the iris.

But as de Wecker judiciously remarks, it is almost impossible by this method to limit the section to the fibres of the iris and not to implicate the cornea, which would be a serious inconvenience.

Thus, to perform iritomy in cases where it is necessary to preserve the integrity of the lens, the latter author advises the use of his scissors forceps, an instrument which in the hands of all has proved its value in section of the iris when the lens is absent.

De Wecker has recommended iritomy with the scissors forceps in zonular cataract. He uses the instrument with blunt points, and after suitable opening of the cornea, he introduces one blade behind the iris, the other in front, and sections the sphincter (1).

But it is very difficult to manipulate the forceps in the anterior chamber when the aqueous humor has escaped, and de Wecker himself admits that this is a very dangerous operation. "It will remain," he says, "like certain operations in general surgery, confined to a few practitioners, and does not seem destined to become common."

This statement explains why, in cases where it is necessary to make an artificial pupil (where the lens is to be respected), whether the subject have a central cataract, a corneal opacity or keratoconus, ophthalmologists have always had recourse to iridectomy. Undoubtedly an effort is made to make it very

(1) See the Theses of Fontaine (Paris, 1873) and Michelon (Paris, 1876), in which the method of operation is given in detail under the direction of de Wecker himself.

small and to limit it to the sphincter (sphincterectomy), but in general a more or less extensive portion of the iris is excised. The very just fear of injuring the lens has withheld emulators from following de Wecker, and I fear that even' this operator has but rarely employed his dangerous method.

There is a way of performing iritomy with no danger, and thus obtaining in all cases an artificial pupil much smaller and consequently far superior to that obtained from iridectomy.

It is this method which I wish to communicate.

External Iritomy, Operative Procedure.—My method consists essentially: 1st, in an incision of the cornea a little in front of the limbus and large enough to permit of easy passage of a small portion of the iris; 2d, by means of iridectomy forceps, the iris is gently drawn out through the wound; 3d, the sphincter is incised to a variable extent according to the case about 2 millimetres, with the scissors forceps; 4th, after this incision the iris is replaced in the anterior chamber.

By these various manœuvres the very dangerous operation which Dr. de Wecker proposed to perform by introducing his scissors forceps into the anterior chamber, is accomplished with no risk.

Let us consider the different steps of this operation. First, without dilating on the antiseptic precautions which should be carefully observed (irrigation of the lachrymal sac with my irrigator, etc.) it should be stated that it is indispensable for the patient to be well under the influence of cocaine and to instil a few drops of eserine five minutes before the operation. Cocaine sufficiently diminishes the tension of the eye so that the return of the iris into the anterior chamber is always readily effected, and eserine more readily maintains this membrane in place, since a small corneal wound, the borders of which are very exactly coapted, is sufficient for this operation. Ten drops of a 4% solution of cocaine should be instilled ten minutes before the operation, and five more drops five minutes before with three or four drops of eserine; this is indispensable both for anaesthesia which is thus complete, and for the useful assistance of contractility of the iris.

First step.—The incision of the cornea should be in the lim-

bus when it is necessary to respect this membrane as far as possible, but the point of election is about three-fourths of a millimetre in front of the sclera. The position of the incision is, however, subordinate to the nature of the lesions for which the operation is performed. It should be on the average 5 millimetres in extent. The smaller it is, the more rapid is cicatrization. But on the other hand it should be large enough so that the iris if it does not spontaneously project into the wound, may be readily drawn out without pressure or noticeable traction.

Second step.—The iris is stretched in front of the corresponding portion of the sclera. The operator draws gently so as to bring out of the eye only the region of the sphincter which is to be excised, and a larger or smaller portion of this region according to the extent which he wishes to give to the iridectomy.

But if it should happen that a large portion of the iris come out through the opening, no apprehension should be felt; the prolapse is of no great importance.

The forceps with which the iris has been drawn out should be relaxed and then seize the sphincter so that one blade is placed against the posterior surface of the iris and the other blade in front. Slight traction is then sufficient to put this membrane on the stretch preparatory to the incision.

Third step.—At the same point where it is held by the forceps the iris is sectioned with the scissors forceps, one branch being in front, and the other behind the iris. Sphincterotomy is thus accomplished. The artificial pupil will evidently depend in its dimension on the extent of this section, which the operator may vary at will. The incision might also be made by transfixion with a very sharp cataract knife, but a cut of the scissors seems to me to be preferable.

Fourth step.—The fourth step consists in returning the iris to its place. Nothing is easier. If the cocaine and eserine were properly accomplished, the membrane will return of itself.

If not, a silver spatula, the ordinary instrument for replacing the iris, and gentle rubbing over the lids may render all the service required under such circumstances.

A compress bandage, moderately tight, like that used after cataract operation, terminates the surgical performance. The patient is put to bed in complete rest with free use of the other eye and in a moderately lighted room. The luminous sensations experienced by the healthy eye act like eserine by causing contraction of the iris in the eye which was operated upon.

Such is the operation which I desire to recommend to my colleagues. I shall have stated all that is necessary to say on this subject when I have defined its indications and counter indications.

Indications and Counter Indications for External Iritomy.—

In general, iritomy is indicated in preference to iridectomy whenever advantage is to be gained from a small artificial pupil. It would seem unnecessary for me to discuss here, after all that has been said on this subject, the rôle of the stenopaïc opening which is obtained by iritomy. This opening in cases of corneal opacity effectively combats diffusion of the luminous rays resulting from astigmatism and the opalescence which surrounds the central leucoma.

When there is an adherent leucoma, iritomy cannot be performed unless a considerable part of the pupillary border is free, but in this case, in which I have not yet had occasion to interfere, we may hope for better results. The pupil will be even smaller than in the other cases on account of the adhesions of the sphincter of the iris with the cornea, adhesions which serve to obstruct the pupillary orifice.

It is not indicated when the corneal cicatrix is ectatic and the eye is affected or menaced with staphyloma. In this case iridectomy remains the best operation by reason of its rôle as moderator of the ocular tension.

In keratoconus where it is also important to diminish the ocular tension, iridectomy would seem to be preferable to iritomy, but I regret not having sufficient experience on this subject to give a definite statement.

Iritomy will certainly give a better optical result, but in general, it should be considered as less capable than the first operation of arresting the progress of conical ectasia.

When keratoconus has been previously treated with cauter-

ization of the summit of the cornea, and after the central opacification and resistance thus obtained, iritomy should have the preference.

In cases of central opacity of the lens, iritomy is far superior to iridectomy. This cannot be denied. Bowmann and de Wecker were well inspired when they claimed the usefulness of a small pupil, and without doubt this operation would have become classical if the methods given by these authors had been practicable. My method of iritomy is of a nature to overcome these difficulties.

But a single objection of secondary order can be made. Artificial pupil performed for central cataract is, as a rule, executed on restless children whom it is very difficult to keep quiet after the operation. In this case extra care should be taken to have the bandage well applied.

Such are the principal indications for this operation. It will be remarked that it is only intended for cases where the lens is to be preserved. I think, in fact, that no change should be made in the present method of performing iritomy or iridectomy in cases where it is indicated after extraction of the lens.

In reserving external iritomy for the cases which I have mentioned, it will always be exempt from inconveniences: The only accident to be feared is adherence of the iris to the corneal wound or prolapse. If eserine and cocaine are carefully instilled before the operation prolapse is not to be feared. But adhesion to the lips of the wound is not impossible; I have once observed this accident, but is it so serious? In this way Critchett's ideal is realized—that is to say, artificial pupil by iridesis. I do not think that this is a perfect result, and iridesis should be avoided as far as possible by complete immobility, a proper bandage, and appropriate readjustment of the iris. It might, however, be said that Critchett's operation has been much employed, and that it is still commonly performed in England; hence the only accident to which iritomy is exposed, and that very rarely, cannot be considered as of great importance.

I have performed this operation on adults four times:

In the first patient there was a very extensive leucoma occupying the middle and lower portion of the cornea, which was only transparent in its upper quarter. The iris was free and the different steps of the operation were accomplished without difficulty, giving as a result a very small pupil with no abnormal adhesion. Vision which was nil before the operation was sufficient to enable the patient, who was illiterate, to distinguish small objects (approximately $V = \frac{1}{4}$).

In the second patient, a woman forty years old, both eyes were in the same condition as that of the first patient. The operation performed successively on the right and left eye with an interval of fifteen days produced the same good results. This woman, a peasant from Perigord, blind before the operation, has since been able to resume all her ordinary work.

The fourth operation was performed on a sailor from Arcachon, who had suffered for some years from chronic keratitis terminating in a central leucoma. With this man the artificial pupil was made in the lower and inner part, and whether the reduction was insufficient, or because the patient did not keep quiet, there was a prolapse of the iris into the wound, so that the final result was as if the patient had been operated upon by iridesis. Otherwise, the pupil was small and vision was better with this patient than with the others.

These cases are too few in number to indicate definitely the value of the method which I recommend. I hope that further observations, made by myself and my colleagues, will soon determine the proper value of this new method for establishing an artificial pupil.

THE CURABILITY OF SYMPATHETIC IRIDO-CHOROIDITIS

By Dr. L. LAQUEUR,

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In the August number of these *Annales*, 1895, Dr. Rogman (Ghent) published an article on the curability of sympathetic uveitis, in which he mentioned, among others, two cases of successful termination which I had observed. As the only knowledge he had of them was from the short communication which I had made on this subject to the Congress of Heidelberg in

1891, he justly states that no information was given as to the progress of the disease. The two cases to which I allude were published, it is true, in the theses of Dr. Kondos (1889) and Dr. Capauner (1890); but as it is difficult to produce these theses, I think it may be of advantage to again describe these cases and to complete them with a statement of their ultimate progress, adding three other cases, which also terminated successfully, and are interesting from other points of view.

Case I.—Lorenz, L., a chair maker, thirty years of age, was seriously injured in the left eye by a blow from a cane, the latter part of August, 1888. When I first saw him eight days after the accident, I found complete blindness in the left eye from internal hemorrhage, commencing phthisis of the eyeball and sensitiveness to touch. The right eye was normal ($V = 1$).

Two months and a half after the accident, the right eye began to trouble him. *The vessels of the conjunctiva were engorged*, and with the ophthalmoscope it was seen that the retinal veins were engorged and the borders of the disc indistinct. $V = \frac{1}{2}$, feeble accommodation. October 20, the injured eye was enucleated. In spite of this the sympathetic affection progressed. November 1 there was found in addition to hyperæmia of the disc and of the retina, a serous iritis with numerous deposits on Descemet's membrane. Vision had diminished to $\frac{1}{4}$. Sub-conjunctival injections of pilocarpine were employed. In spite of this treatment, exudations formed in the pupillary field and circumscribed foci in the periphery of the choroid. Vision diminished to $\frac{1}{16}$. But in the following months, during which the patient was kept perfectly quiet and treated with mercurial enunciations, the condition slowly improved. One year after the commencement of the disease, V had increased to $\frac{1}{2}$, and a myopia of 3 D. had developed. The deposits on the posterior surface of the cornea had not completely disappeared.

Four years later the eye no longer presented conjunctival injection. M of 2 D., $V = \frac{1}{2}$ to $\frac{1}{4}$. The retinal hyperæmia had completely disappeared, but the periphery of the choroid still contained numerous small white foci and in the region of the yellow spot was a circular pigment focus equal in diameter to half the diameter of the disc. There was still a small posterior synechia, and six to eight small pigment spots on Descemet's membrane. *The patient had resumed his former occupation.*

The last examination, made in 1894, six years after the beginning

of the disease, showed the same satisfactory condition, which may therefore be considered as permanent.

In the case just described the sympathetic affection began eleven weeks after the injury and started in the form of retinal hyperæmia. It was not until later that the signs of a phlegmasia of the iris appeared. Enucleation of the injured eye, performed immediately after the appearance of the sympathetic affection, was ineffective; the disease progressed and led almost to blindness. But, little by little, the exudations in the pupillary field diminished, thanks to appropriate treatment, and there remained finally only a small posterior synechia and some foci in the choroid.

Case II.—Maria K—, twenty-one years old, had been affected with buphthalmus and amaurosis in the left eye from infancy. The only abnormal phenomenon in the right eye was a slight enlargement of the cornea (12 to 13 millimetres): $V = \frac{1}{3}$. In October, 1888, the patient injured her left eye by falling against a beam, and one month later, she noticed a diminution in the sight of the other. December 20, 1888, there was commencing atrophy of the left eye ($T = 1$), large and clouded cornea, deep anterior chamber. A yellow reflex came from the fundus of the pupil, and the eyeball was sensitive to the touch. In the right eye there was intense photophobia and serous iritis; $V = \frac{1}{4}$.

On the next day the left eye was enucleated. It did not arrest the progress of the disease in the right eye. New deposits were formed on the posterior surface of the cornea and also extensive posterior synechiæ. The pupil was, however, slightly dilated under the influence of atropine.

March 4, 1889, $V = \frac{1}{4}$. As the result of treatment consisting of mercurial inunctions, and injections of pilocarpine, vision improved, and one month later it equalled $\frac{1}{4}$.

May, 1889, relapse: iris highly pigmented and projecting forward in the lower external part; dilated vessels were seen in it: $V = \frac{1}{16}$.

She re-entered the hospital, and as a result of further treatment there was again improvement followed by another relapse in December, 1889, after which fingers could only be counted at 50 centimetres ($V = \frac{1}{16}$).

The pupil was irregular, there were numerous posterior synechiæ, but there was not total occlusion of the pupillary field; $T + 1$. The

latter part of December, 1889, a sclerotomy was performed in the lower and outer part.

Slight improvement. January 18, 1890, the anterior chamber was re-established and the fundus of the eye was visible. Opacities were found in the vitreous and a star-shaped cloud in the posterior part of the lens. $V = \frac{1}{8}$.

April 10, 1890, another relapse of plastic iritis. This time the pupil was entirely closed, and there was a circular synechia. Iriderectomy was performed, and as the lens was found to be opaque, it was extracted at the same time.

The result of the operation was nil, as a secondary cataract formed obstructing the pupil; $V =$ perception of light.

June 1, 1890, discission of the secondary cataract with a needle. June 10, the patient counted fingers at 1 metre. July 5, 1890, second discission followed again by occlusion of the pupil, as the result of which vision was reduced to perception of light. This condition remained until January, 1893. The normal tension of the eyeball had not varied during all this lapse of time.

January 25th, 1892, an iridotomy was performed with de Wecker's instrument, and a quadrangular opening, 2 millimetres square, was formed. This time the artificial pupil did not close. March 5, $V = \frac{1}{4}$ (with sph. + 10 D., combined with cyl. + 6 D.). August 10, 1892, $V = \frac{1}{4}$, and five months after, the same condition was found. The patient can work, read, and sew.

We see in this case that one month after a contusion of a buphthalmic eye, malignant iritis set in in its ordinary form. The attacks were combated with relative success. Four times more and more serious relapses occurred. Sclerotomy, iridectomy, extraction of cataract, and two discissions did not succeed in arresting total occlusion of the pupil. Iridotomy alone, performed eighteen months after the last of these different operations and when all irritation in the eye had disappeared, led to recovery. The recovery is not perfect, it is true, since vision does not exceed $\frac{1}{4}$ and the opacities in the vitreous persist, but the patient has gained sufficient vision to perform her daily occupation.

The following are two other cases of successful issue described in Dr. Capauner's thesis, and a fifth one still older.

Case III.—Laura M.—, nine years old, injured her left eye in January, 1890, by falling against the key of a door.

A few days after the injured eye presented a large vertical cicatrix of the cornea adherent to the iris, and extending upward and downward into the sclera; the anterior chamber was partly filled with fluid blood. $V =$ perception of light. Two months after the accident the right eye, till then healthy, was affected. There were two posterior synechiæ and slight cloudiness of the cornea, but no retinal hyperæmia; $V = \frac{1}{4}$.

March 26, enucleation of the left eye.

April 8, 1890, no improvement. No conjunctival injection, but numerous deposits on Descemet's membrane; tortuous veins in the retina, disk red, floating opacities in the vitreous. Treatment: Mercurial inunctions, atropine and complete rest.

April 25, 1890, marked improvement, the posterior synechiæ had been torn away, the pupil was round and the opacities in the vitreous were clearer.

May 23, 1890, $V = \frac{1}{4}$. Only a few deposits were found in the form of small spots on the posterior surface of the cornea and a few pigment spots on the anterior capsule of the lens; in other respects the eye is normal.

May 22, 1891 (one year later), the same favorable condition.

Case IV.—Hermine K—, ten years old, was injured December 31, 1889, in the left eye by the explosion of a cartridge. Five days after there was a linear and vertical cicatrix in the central part of the cornea, 3 millimetres in length, without adhesion to the iris. There was also a soft cataract. The eye was slightly injected, tension a little below normal, perception of light. The right eye was normal; $V = 1$. February 11, 1889, extraction of the cataract. In spite of this the eye became phthisical. As the patient began to complain of trouble in the right eye, I enucleated the left eye on March 11, and gave mercurial inunctions in the dose of 1 gramme daily.

March 28, there was serous iritis with decided hyperæmia of the retinal veins; $V = \frac{1}{4}$. H of 3 D.

April 13, 1890, numerous deposits on Descemet's membrane. Quite intense cloudiness of the cornea; $V = \frac{1}{4}$.

April 15, paracentesis of the anterior chamber.

May 3, condition worse, cornea clouded, anterior chamber deep, opacities of the vitreous, $V = \frac{1}{10}$.

May 18, second puncture of the anterior chamber.

June 23, 1890, condition improved. $V = \frac{1}{6}$. Myopia of 2.5 D. Cloudiness of the cornea still quite intense, numerous posterior synechiæ. There was a gray pseudo-membrane occupying nearly all the pupil.

May 24, 1891 (consequently eleven months later), M of 2 D. $V = \frac{1}{3}$, read No. 3, Jaeger. No injection of the eye, almost total posterior synechiæ, but no projection of the iris and no increase of intra-ocular pressure. The child went to school and could read and write without difficulty.

Case V.—Philippe L——, thirteen years old, came to the clinic November 10, 1876, with an injury of the cornea and of the sclera, and an anterior synechia of the right eye; $V = \frac{1}{10}$. In the left eye was a severe iritis, almost complete posterior synechia, and deposits on the posterior surface of the cornea. The pupillary field was, however, free. $V = \frac{1}{4}$.

The patient was admitted to the clinic and treated with mercurial inunctions. Improvement (OD, $V = \frac{1}{10}$, OS, $V = \frac{1}{2}$), which continued until March, 1878.

March 28, 1878, there was considerable diminution in the vision of both eyes: OD, $V = \frac{1}{10}$; OS, $V = \frac{1}{10}$. The right eye was highly injected and sensitive to the touch. In the left eye the iris was prominent and presented four swellings; it was also very deeply pigmented, so that it appeared almost black. T — 2.

April 5 (after complete rest) the glaucomatous condition of the left eye had diminished and, a curious fact, the pigmentation of the iris had disappeared. But as the condition of the eye was unchanged the injured organ was enucleated. In spite of this there was another relapse on April 23, with hardness of the eyeball, and for several months the eye passed through various stages, better and worse.

February 5, 1879, V had diminished to $\frac{1}{10}$, and the eye began to become soft. An attempt was made to perform iridectomy, but only a small portion of the iris was removed. The immediate effect of the iridectomy was nil. The patient was considered permanently blind and admitted to the institution for blind children at Illzach.

August 13, 1890, there was a decided improvement of spontaneous occurrence, as there had been no treatment for sixteen months. The patient could count fingers at 4 metres and read moderate sized characters. The anterior chamber was flattened, and the exterior part of the iris was adherent to the cornea. The coloboma resulting from the iridectomy was almost entirely filled with a mass of pigment, but a small lacuna had remained free.

October 21, 1882, $V = \frac{1}{4}$ with Sph. — 3.5 D. T normal.

September 22, 1886 (four years later), M of 8 D. $V = \frac{1}{4}$.

The patient readily reads ordinary characters.

Here are, then, five cases of plastic irido-choroiditis of sympathetic origin which terminated in results scarcely to be hoped for. I might contrast with them, it is true, many cases which resulted in the usual unfortunate way, among which are cases resulting from cataract operations. But my observations, as well as those collected by Dr. Rogman, prove that one should hesitate to give too unfavorable a prognosis, and that Dr. Knies' thesis, quoted by Dr. Rogman, in which it was said that the condition of an eye inflamed by sympathy is no better than that of its mate disorganized by traumatism, is in a general way not sustainable.

I may be allowed to add a few remarks relative to the cases which I have described.

1st. In reading these cases, one is struck with *the inefficiency of enucleation* of the injured eye. In all five cases this was performed as soon as possible and in no one of them did it arrest the progress of the sympathetic phlegmasia. One is tempted to conclude from this fact that this operation is useless if not harmful. But this conclusion would be erroneous, and on the contrary, the rule should be maintained that treatment of plastic irido-cyclitis of sympathetic origin should commence with enucleation of the injured eye, provided the latter is lost for vision. We are certain that the injured eye is the point of origin of the inflammatory process. It is then rational to eliminate the primary focus, which even after arrest of the sympathetic symptoms may continue to have an evil influence on the other eye. We do not by enucleation destroy the pathological products of the sympathizing eye, but we prevent further irritation emanating from the injured eye and thus establish favorable conditions for efficient treatment. As enucleation is the most radical operation, I do not think that it may be advantageously replaced either by exenteration of the eyeball or by section of the optic nerve and the ciliary nerves.

2d. *The age of the patients* seems to be of some importance in the successful termination of the disease. Three of my cases were children, and not one of them was over thirty years old. In most of the cases collected by Dr. Rogman, the patients were also young. It would seem that only the high

degree of nutrition of the tissues in youth was able to triumph over the serious obstacles produced by sympathetic inflammation. It is probably for this reason that the affections resulting from cataract operations, which are generally performed on old people, almost always take an unfavorable course.

3d. *The form* of the sympathetic inflammation seems also to play a rôle in the progress of the disease. Cases which commence with intense and rapid exudation into the pupillary field are the most severe, while those in which the first signs appear in the fundus of the eye (hyperæmia of the retina, redness of the disc) allow us to give a more favorable prognosis. This second class of cases is unfortunately much less frequent. In the first of my cases, we see that the hyperæmia of the retinal veins preceded the symptoms in the iris, and in the fourth, it was found to accompany the first signs of serous iritis. If the bacteriological theory of sympathetic irido-cyclitis is granted, it might be said that the microbes which emigrate by the central artery of the retina and the posterior ciliary arteries produce less dangerous disturbances than those which invade the eye by way of the long ciliary arteries and the anterior ciliary arteries.

4th. *Treatment* of this redoubtable affection should be both medical and surgical. As I have said, the injured eye must first be enucleated when it is permanently blind. Then mydriatics should be employed to dilate the pupil, and anti-plastic and derivative treatment consisting of energetic mercurial inunctions and injections of pilocarpine should be commenced early. General mercurial treatment is that in which the greatest confidence may be placed. I have not yet in these cases employed sub-conjunctival injections of sublimate, but the good results which other observers have obtained in severe forms of iritis seem to justify their application to such cases as we are considering. No illusions, however, should be entertained concerning their immediate effect. Generally neither mercurial treatment nor diaphoresis will prevent the formation of large synechiæ and even occlusion of the pupil; the only result will be to maintain the exudations within moderate limits. Then surgical intervention is indicated, and recourse should be had to iridectomy, cataract extraction, and opera-

tions for secondary cataract. It will rarely happen that the first operations will give the desired result; in most cases it will be necessary to operate two or three times, or even more frequently. As the operative traumatism ordinarily produces renewed exudation from the iris, this will happen the more readily while the eye is still in an irritated condition. It is then of the greatest importance to defer surgical intervention as long as possible, and while waiting to assuage the irritation by appropriate treatment, complete rest in a dark room, application of warm compresses to the diseased eye. During this time examination should be carefully made of the ocular tension, the sensitiveness to touch and the perception to light, both of the centre and the periphery of the retina. There is only one circumstance which should force us to abandon this line of conduct and to interfere before the irritation has completely disappeared from the diseased eye: I speak of rapid increase of intraocular pressure resulting from a circular posterior synechia. In this case sclerotomy or iridectomy should be performed, an operation which is very difficult to execute, considering the narrowness of the anterior chamber and the friability of the iris sphincter. *Except under such circumstances, one should conform to the rule of not touching the eye as long as there is still appreciable injection of the conjunctiva and sensitiveness to touch.*

The case of Maria K——, which gave a truly surprising result, and in which iridotomy had been performed eighteen months after the preceding operations, may serve to confirm the justice of this rule.

5th. I have been struck with the fact that sympathetic iridocyclitis, formerly so frequent, has become much rarer of late years. For two or three years I have hardly encountered a typical case to present to the pupils at my clinics. Several of my colleagues to whom I have mentioned this subject, Dr. Panas among others, have made the same observation. It would seem then that this is not the effect of chance. To what should this fortunate circumstance be attributed? As severe injuries of the eye are certainly no less frequent now than formerly, Dr. Panas thinks that the cause should be sought

in the aseptic treatment of wounds of the eye, and I think that he is right. Those who uphold the microbial origin of sympathetic inflammation, should not fail to consider this fact as an argument in favor of their theory. But on careful reflection it will be found that every other theory is compatible with it. We know that sympathetic uveitis only develops as the result of prolonged inflammatory irritation of the injured eye, and aseptic treatment acts favorably and possibly in a unique way since it produces cicatrization of the wound.

WHY STRONG CONTRA-GENERIC LENSES * OF EQUAL POWER FAIL TO NEUTRAL- IZE EACH OTHER

By **CHARLES F. PRENTICE**, New York.

Some time ago Mr. George W. Wells, President of the American Optical Company, Southbridge, Mass., requested me to give this subject attention, and, as it contains features of mutual interest to oculists and opticians, I have considered it of sufficient importance to give the results of my investigation publicity.

In ophthalmic practice it is customary to determine the power of a lens by what is known as "neutralization." It is here proposed to show why it is that this method is only strictly applicable to lenses which are weaker than 9 dioptries. The power of a lens, as is well known, is dependent upon three factors—the radius of curvature, index of refraction, and thickness of glass. The latter we are taught to consider a negligible quantity, since it is generally infinitely small in proportion to the focal distances of lenses which are used in spectacles. This is only justified in its application to *concave* lenses, since all concave lenses, between 0.25 and 20 D., can be made of the same infinite thinness in the centre. In convex lenses, however, we meet with an unavoidable increase in thickness, which be-

* Lenses of opposite character—convex and concave. First used in a monograph: *Dioptric Formulae for Combined Cylindrical Lenses*, by Charles F. Prentice. New York, 1888.

comes of sufficient magnitude in lenses above 8 D. to conflict with the hypothesis referred to. When the element of thickness is considered, we have the formula for bi-spherical lenses of equal curvatures:

$$r = F(n - 1) + \sqrt{\frac{(nF - e) F (n - 1)^2}{n}}, \quad \text{I.}$$

wherein r is the radius of curvature, n the index of refraction, F the focus, and e the thickness, in contradistinction to the formula for neglected thickness, wherein

$$r = 2F(n - 1). \quad \text{II.}$$

It is therefore evident that the radius of curvature will be a different one for bi-convex lenses, in which thickness is considered, from that of bi-concave lenses, of the same power, having no thickness.

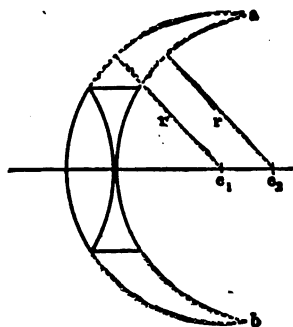


Fig. 1.

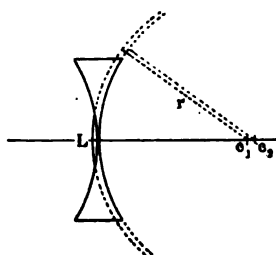


Fig. 2.

The accompanying diagram, Fig. 1, representing a bi-convex and a bi-concave lens of *identical* curvatures, clearly shows that they cannot optically neutralize each other, as they really only constitute the central portion of a much larger periscopic *convex* lens, and which our imagination can construct upon the dotted lines which are continued to their intersections at *a* and *b*.

The diagram also shows that the power of the imaginary convex meniscus must *increase* with an increase in the thickness of the bi-convex lens, because the anterior and posterior surfaces of the meniscus will be rendered more oblique to each other as

their respective centres of curvature, c_1 and c_2 , are separated to provide an increased thickness. The nearest approach to neutralization will therefore be secured when the centres of curvature, c_1 and c_2 , are as close together as possible, thus making the bi-convex lens L exceedingly small and thin, as shown in Fig. 2.

The lenses in our trial cases are, however, too large to secure even this *approximate* neutralization. Their diameter of necessity determines the thickness, which must increase with the power. For instance, in a 20 D. convex trial-case lens of 3.5 centimetres diameter we find the minimum thickness to be 0.75 centimetres. If, therefore, in Formula I., we place $\phi = 0.75$, $n = 1.5$, and $F = 5$ centimetres, we obtain 4.87 centimetres as the value of r , whereas, for a 20 D. concave lens, according to Formula II., we find $r = 5$ centimetres.

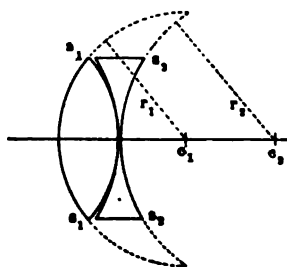


Fig. 3.

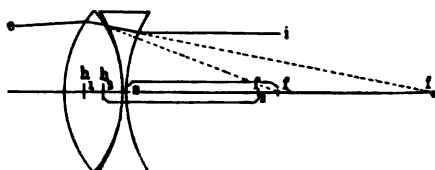


Fig. 4.

As the radius is shorter for the convex than for the concave lens of the same power, it is evident that their surfaces will actually only touch in the centre, as exaggeratedly shown in Fig. 3.

Besides, the outer surface, s_1 , of the convex lens will be even more oblique relatively to the outer one, s_2 , of the concave lens, so that the lenses form the centre of a stronger convex meniscus than shown in Fig. 1. Or, viewing it in another light: Parallel rays, i , which are incident to the concave lens, are refracted by it, passing into the convex lens, as if emanating from the virtual focal point, f , of the concave lens, which is outside of the focal point, f_2 , of the convex one, Fig. 4.

Such rays, e , will therefore be rendered convergent, instead of parallel, in passing out of the convex lens, showing that neutralization does not exist.

The focal distance, in infinitely thin lenses, is counted from a single point, s , on the optical axis in the centre of the lens, whereas in lenses of appreciable thickness it is counted from the *posterior principal point*, h_2 , within the lens. In a bi-convex lens of equal curvatures, made of glass, with an index of refraction $n = 1.5$, it has been demonstrated that the principal points, h_1 and h_2 , are separated by a distance equal to one-third of the lens thickness (1). It is therefore obvious that the focal distance of the convex lens will have to be increased by at least one-third of the lens thickness, so as to have f_1 and f_2 coincide for the purpose of producing neutralization.

With a minimum thickness equal to 0.75 cm., we must, consequently, add 0.25 to the focal distance, 5, making 5.25 the focal distance of the convex lens. This corresponds to a refraction of 19.047 dioptries. Consequently, a 19.047 convex lens of 0.75 cm. thickness neutralizes a 20 D. concave lens of no thickness. To be more accurate, we should actually allow for one millimetre thickness of the concave lens. This would result in the convex lens being even somewhat weaker than 19.047 dioptries.

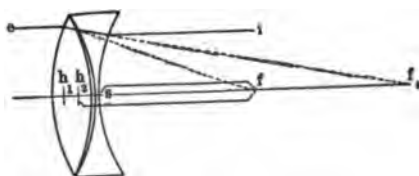


Fig. 5.

However, according to Formula I., a 19.047 D. convex lens of 0.75 cm. thickness should have a radius $r = 5.121$ cm., so that the superposed neutralizing lenses would actually touch each other at their edges, instead of at the centre, as exaggeratedly shown in Fig. 5.

Furthermore, any additional increase in the thickness of the convex lens will be associated with an increase in the distance

(1) Müller-Pouillet's *Lehrbuch der Physik*, page 160. Braunschweig, 1894.

h , f , and will therefore call for a corresponding decrease in the power of the convex lens to produce neutralization.

Thus, the tendency will invariably be to overestimate the power of the convex lens when an effort is made to determine its power by that of a concave one which neutralizes it.

Calculation shows that discrepancies in neutralization varying between 0.25 and 1 D. exist in the entire series of convex lenses between 9 and 20 D. It consequently also follows that the indiscriminate addition of lenses, as frequently practised during the subjective method of examination of ocular refraction, is not permissible for lenses of high power.

In other words, lenses of high power are no more capable of being algebraically combined than prisms of high power, a fault for which the practicability of the prism-dioptre was so severely criticised. The same logic therefore applies to lenses which I mentioned in my paper on the Prismometric Scale(1), to wit:

“The desire to multiply any *unit in optics* should be curbed by a knowledge of the fact that all the fundamental optical laws are based upon the assumption and acceptance of *values of limited magnitude*, and that there is therefore apt to be a point where *unreasonable* multiplication of an optical unit will contradict the actually existing optical phenomenon.”

The general, though erroneous, impression that the entire series of corresponding contra-generic lenses should neutralize has gained such credence that lens manufacturers have allowed themselves to be swayed by this popular opinion, and as a result have adopted the principle of making the convex weaker than the concave lenses, so as to meet the demand for neutralization. As has been shown, a 20 D. convex lens should have a shorter radius than a concave one of the same power, yet examination of any trial case will reveal the fact that the reverse is the case, when the surfaces are measured by a suitable gauge. We can, however, gain no reliable information regarding the power of a strong convex lens by measurement of its surfaces, since two lenses of the same curvature, but of different thick-

(1) See American Journal of Ophthalmology, St. Louis, Oct. 1891.

ness, will not be of the same power. As the thickness increases, the power will diminish for one and the same curvature.

This is shown in Fig. 6.

The incident ray, i , is refracted by the anterior surface of the lens ab in the direction xf_0 , and by the posterior surface at y to the focus f . If the thickness be increased, so as to place the posterior surface at cd , then xf_0 will be refracted at the posterior surface at z to F , parallel to yf , since the surface cd is of the same radius as ab .

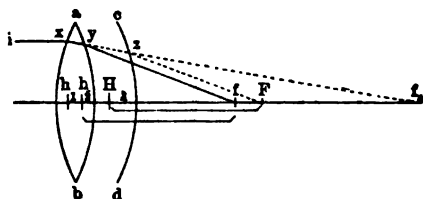


Fig. 6.

The focal distance H, F , in the diagram, is not appreciably different from h, f ; in fact, the difference between these distances scarcely amounts to 0.05 cm., for a curvature of 5 cm. in lenses of 0.75 and 1 cm. thickness. Nevertheless, such a difference would be appreciated by the eye in neutralizing. The question then arises: By what method should we determine the power of strong lenses? Indeed, nothing seems to remain but to measure them by a focussing screen upon a graduated bar, care being taken to count the focal distance from the posterior principal point within the lens. While concave lenses can be similarly measured, yet this is somewhat difficult, and not entirely satisfactory. The lens surface measure is indeed preferable *only for concave lenses*, since they are of negligible thickness.

It will, however, be more or less inconvenient to have individually different methods of measurement for convex and concave lenses. Unless, therefore, we are prepared to make some radical change, we shall do well to adhere to the practice of neutralization, bearing in mind the errors we commit by so doing. When convex lenses stronger than 8 dioptries are

prescribed, and they are measured by neutralization with a concave lens, we should remember that they are always weaker than the dioptries indicated by the concave lens. In short, *the convex lenses in our trial cases are not what they are numbered in dioptries.*

So long, however, as manufacturers are agreed that the convex lenses they produce shall neutralize with standard concave lenses, we shall at least have a uniformity which will insure the convex lenses in spectacles being duplicates of those in the trial case; *provided*, also, that the lenses of any given number are always of the same uniform thickness. This thickness, in every instance, should be the least which can be given to the lens of 3.5 cm. standard diameter.

II.—REPORTS OF SOCIETIES

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of November 5, 1895.

The Attesting Bandage and the Simple Bandage in Cataract Operation.

DR. VACHER.—Since the year 1886 I have been in the habit of applying, before every cataract operation, an occlusive bandage with a pad twenty-four hours before the operation. If on the next day there is secretion, and if the palpebral borders are covered with muco pus, I defer the operation and treat the conjunctiva until no more secretion is produced under the bandage. It should be stated that occlusion of eyes which are slightly suppurating produces a rapid increase in this suppuration, an inflammation which advances with the duration of the occlusion and ceases with it. On the other hand, occlusion, even prolonged, of healthy eyes in no way alters their condition. Last year Dr. Nuel, in his report on operative asepsis, claimed priority of the application of an attesting bandage without mentioning my name. I desire to state that I was the first to recommend this method, as may be seen by consulting my *Traité d'Ophthalmologie* which appeared in 1889.

As for the post-operative bandage, if the eye does not secrete under the influence of the attesting bandage, I apply a small antiseptic pad which I attach to the forehead and the cheek with collo-

dion. If there is conjunctival secretion and I am forced to interfere, I maintain occlusion of the lids by a small band attached with collodion to the two lids. This band is narrow and only covers the median portion of the lids. They are thus only hidden for a width of 1 centimetre at the most, the two angles being entirely free, and they may be inspected and bathed as frequently as is necessary.

This collodion bandage is very simple, and since I have employed it I have seen no increase in the proportion of prolapses of the iris. The patients prefer it to the ordinary bandage.

Dr. Valude.—I believe that the operators who recommend the attesting bandage are misled when they attribute to it the good results of their cataract operations. The improvement in their statistics is dependent upon the fact that the antiseptic method of operating is becoming every day more sure and more exact. It frequently happens that during the first bandage of a patient operated upon for cataract, after three or four days, the eye is found to be bathed in abundant purulent secretion without the process of cicatrization being in the least impaired. In such a case, the attesting bandage would have given chimerical fears. The existence of secretion does not necessarily imply the presence of harmful and infectious germs.

As for the method of bandaging which Dr. Vacher calls a simple bandage, it is well known but little esteemed. This is the method of bandaging which Chisolm recommended some years ago, and for which various substances have been used. I have seen Dr. Gayet at Lyons employ a multiplication of this bandage, and I have experimented with it for several months in my service. I have been obliged to abandon it as it was so defective, and because it gave but uncertain protection to the eye operated upon. I do not doubt that Dr. Vacher will return to the old form of bandaging after he has observed a greater number of cases.

Dr. Kalt.—I quite agree with Dr. Valude as to the inutility of an attesting bandage. As for the post-operative bandage, its rôle is essentially to protect the eyeball against pressure from pillows, or contact with the hand. No one longer believes in the compressive rôle of a bandage, and I think one should endeavor to obtain a purely protective bandage. The metallic netting of Fuchs seems to me to be very useful. As for the conjunctival catarrh produced by the bandage, it is quite variable. Since I no longer use antiseptics, and especially sublimate, for cleansing the conjunctiva, the conjunctival secretion is much less abundant and cases of infection are no more frequent with asepsis than with antiseptics. The ideal bandage seems

to me to be a cup which can be well kept in place, applied in front of the eye without compression and capable of protecting it against injury.

Dr. Despagne.—Does Dr. Vacher frequently refuse to operate after the appearance of secretion on the removal of the attesting bandage?

Dr. Vacher.—I frequently retain the patient several days and instil nitrate of silver until the catarrh has disappeared.

Dr. Despagne.—I do not think that reliable conclusions can be drawn from the application of an attesting bandage, and I remember performing cataract operation on two patients with granulations and abundant conjunctival secretions and obtained an excellent result. I have found no inconvenience from the use of sublimate in proportion of $\frac{1}{1000}$.

Dr. Meyer.—I always apply the attesting bandage which Dr. Vacher mentioned, for I cleanse the eye the day before the operation, and cover it with a bandage until the time of the operation; however, I do not follow this practice for the purpose desired by those who recommend this attesting bandage. I take the precaution to cleanse or irrigate the conjunctiva immediately before the operation, and I operate whatever be the condition of the eye under the bandage, attaching no importance to whether there is or is not secretion. I have not employed sublimate for a long time.

As for the post-operative bandage, this has not been changed for a long time. It was Sichel who taught us how to apply a bandage, not to compress the eye, but for the purpose of protecting and immobilizing it. I apply a pad of dry lint, a small layer of cotton and a gauze bandage. I leave the bandage in place two or three days, and if on removal of the bandage there is slight secretion, no apprehension is felt, as I know that it is not a sign of infection. The aluminium cup of Snelling seems to me to be the ideal desired by Dr. Kalt. Chibret has his patients wear large spectacles with cotton pads after the third day.

The simple bandage recommended by Vacher seems to me to be dangerous and I am persuaded that my colleague will abandon its use.

My colleague, Professor Gayet, has abandoned this class of bandages on account of their lack of security.

Dr. A. Terson.—There is one experiment which may be made by all operators to bandage both eyes before cataract operation. The eye operated upon which has been bathed and antiseptically cleansed produces but little or no secretion under the first bandage, while the

eye not operated upon and which has not been antiseptically cleansed, always gives under the bandage a very abundant secretion. This comparison is easy to make, and as Dr. Panas has frequently stated in connection with his numerous cases at the Hotel Dieu, would seem to prove the undoubted advantage of antiseptic cleansing since it suppresses the secretion on one side, and also how rash it would be to form a conclusion from the application of a bandage, since the majority of eyes not antiseptically cleansed secrete abundantly without previous occlusion. If the usual antiseptic cleansing is applied to these eyes, the same results will be obtained as on the other side, provided the ciliary border is carefully cleansed and that there is neither dachryocystitis nor blepharitis.

Dr. Gorecki.—Antiseptics have an irritant effect on the eye which may be avoided by the addition of albumen. It is sufficient for this purpose to add to the solutions a little white of egg. I am in the habit of cleansing both eyes.

Dr. Vignes.—I have used the collodion bandage, and have found no more complication from its use than before I employed it.

Dr. Kalt.—I only cover the eye operated upon, and I frequently notice that there is more abundant secretion in the eye not operated upon and uncovered than in the eye operated upon.

Dr. Masselon.—I have seen some patients who had no post-operative bandage applied, and who suffered no evil results, but this cannot be considered as a method to be followed in all cases.

Dr. Vacher.—I have also attempted to tie two of the lashes so as to obtain occlusion of the lids by this simple process. Since I have used the simple collodion bandage, the proportion of prolapsus of the iris has not exceeded 3.25%.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of October 17.

Bilateral Glioma of the Retina Cured by Enucleation of Both Eyes.

MR. TREACHER COLLINS reported four cases of bilateral glioma of the retina cured by enucleation of both eyes. *First Case.*—A boy five months old. The right eye was first enucleated, and three years later the left eye. Three and a half years after removal of the second eye his health was perfect, and there was no sign of recurrence. *Second Case.*—A girl five months old, whose left eye was removed. The right eye was enucleated nine months later. Four

years and seven months after the second operation, the patient showed no symptom of recurrence of the neoplasm. *Third Case.*—A girl ten months old, whose left eye had been removed. The right eye was removed thirteen months later. Four years after, her health was perfectly normal. *Fourth Case.*—A boy in whom both eyes were removed at the age of sixteen months. Three years and three months later there was no recurrence.

If it is remembered, as has been shown by Mr. Lawford and the author, that recurrence always comes at the maximum three years later in cases of monolateral enucleation, it will be granted that double enucleation is the only way to save the patient.

Mr. Larrey has seen operation refused by the parents in one case, and consent only given when the painful symptoms appeared, and when the optic nerve had been attacked by the new growth. The child died later from a recurrence.

Mr. Lawford removed an eye affected with glioma of the retina in a child two months old. Two years and a half later glioma appeared in the other eye. The parents refused enucleation. In four years the eye became painful and was removed, but the result could only be fatal, as the optic nerve was invaded by the gliomous tissue.

Detachment of the Choroid.

MR. DEVEREUX MARSHALL has observed three cases of detachment of the choroid. *First Case.*—A girl twenty years old suffering from glaucoma. Iridectomy was performed. Three days later the eye became very painful, and a large hemorrhage in the choroid was found. On examination after enucleation of the eye, it was found that there was total detachment of the retina and of the choroid. *Second Case.*—A man sixty years old with glaucoma. As iridectomy did not relieve the pain, enucleation was performed. The retina and the choroid were detached, and the sub-choroidal space was filled with newly-formed tissue containing cystic spaces. The supra-choroidal layer and the lamina fusca were very much thickened. *Third Case.*—A man sixty-eight years old who had been operated on for cataract. His vision was $\frac{1}{4}$, and he could read nearby the letters of No. 1 in Jaeger's scale, but six months later with vision diminished. Fearing a neoplasm, enucleation was performed. There was almost total detachment of the choroid and of the retina. The only points of attachment to the sclera were those where the vessels and the nerves penetrated. The sub-choroidal space contained serous exudation.

This last case is very rare. It was doubtless due to hyalitis, cho-

rio-retinitis, and the serous exudation between the choroid and the sclera. The differential diagnosis from a tumor is based on the ocular tension.

ACADEMY OF MEDICINE

Session of October 22.

Treatment of Simple Chronic Glaucoma.

DR. C. H. ABADIE.—Acute glaucoma and inflammatory glaucoma proceeding by successive attacks are cured by iridectomy.

The same is not true of simple chronic glaucoma with elevated tension, which develops slowly and progressively, and in which the intraocular pressure increases without giving rise to appreciable reactions.

Iridectomy and sclerotomy have no curative action, and in spite of these operations, the momentarily diminished intraocular tension resumes a higher degree than the normal, and final loss of vision is the rule.

The author advises regular and systematic use of a myotic collyrium of eserine or pilocarpine of 1%, $\frac{1}{2}$ %, or $\frac{1}{4}$ %, according to the tolerance of the patient.

The effects of these instillations are still better, and the certainty of recovery greater, if the following medication is also employed: internal administration of bromide of potassium and sulphate of quinine. For a month Dr. Abadie gives a daily dose of 1 to 2 grammes of bromide of potassium and every other day a pill of 30 to 50 centigrams of sulphate of quinine. Collyrium of eserine, or of pilocarpine, or of both myotics combined, is instilled once a day.

At the end of a month medication is suspended four days in the week. Later, when the tension has become normal, it is continued, but only every other eight days, and this indefinitely, if it is necessary.

Session of October 29.

Glaucomatous Atrophy of the Optic Discs in Syphilitic Patients Simulating Tabes; Recovery after Repeated Sclerotomies.

DR. GALEZOWSKI.—Certain varieties of glaucomatous atrophy of the discs are frequently confused with ataxic atrophies. The following signs may help to avoid this error.

If the affection is glaucomatous, then:

1st. The disc is white, more especially on the external side.

2d. The central veins of the optic nerve are diminished in size at

their point of emergence, but after crossing with the central arteries, most frequently near the edge of the disc, they become larger.

3d. Sub-cutaneous pulsation of the central artery is seen.

4th. The pupil contracts to light, but it is enlarged and irregular.

5th. The visual field is narrowed in the internal or supero-internal portion, while it remains normal at least for a long time in the external and inferior portion.

6th. Dyschromatopsia does not exist at the beginning of the disease, and is hardly appreciable later when the opaque zone of the internal visual field has reached the central point of vision.

7th. The patellar reflexes are preserved and there are no shooting pains.

The disease is of gouty, arthritic, or syphilitic origin.

Repeated anterior sclerotomy and general treatment appropriate to the diathesis (gout, syphilis) considerably improve the atrophy of the disc and sometimes even arrest it, as I have found in five out of seven cases which have come under my observation.

Treatment of Purulent Ophthalmia by Copious Irrigation.

DR. KALT reports that the number of cases of ophthalmia treated at the *Quinze-Vingt* by copious irrigations of permanganate of potash as he has advised, is now 200—31 adults and 169 new-born.

Dr. Kalt prefers permanganate of potash to permanganate of lime, as it is less irritating. For both, the proportions should be 1 gramme to 3 litres of water at 25° C.

Permanganate of lime or potash.....	20 gr.
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Distilled water.....	300 gr.
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A teaspoonful to a litre of water.

Each eye should receive a litre and a half of this fluid at a time.

The first two days four irrigations should be made, three only with permanganate of potash; then three for two or three days; finally, two until the end. They should not be arrested until all secretion has disappeared for two days. If the affection lasts more than fifteen or eighteen days, recourse should be had to permanganate of potash.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX

Session of October 4.

Ectopia of the Lens.

DR. SOUS.—I have observed two children, brother and sister, with ectopia of the lens. In both of them the iris was tremulous on both

sides, and in both their eyes the lens was seen displaced downward and in a condition of subluxation.

It is not rare to meet several persons of the same family affected with ectopia of the lens. Dixon has described four cases in the same family, the mother and her three children. Bryant and Morrow have seen a family composed of seven persons, five of whom had ectopia of the lens. In our city, Dr. Badal has observed this anomaly in aunt and nephew.

What is the cause of this error of conformation? Becker's theory is most frequently given. This author attributes the abnormal condition of the lens to delay in closure of the pupil opening.

If Becker's theory were true, all congenital displacements would be upward. I think that it is more proper to interpret these facts by an alteration, inflammation or absence of formation of a part of the zonular, which would bring a portion of the periphery of the lens into immediate relation with the sclera and cause an adhesion at this point. This adhesion would be the point of origin and the cause of the displacement of the lens.

FRENCH CONGRESS OF SURGERY

Ninth Session, October, 1895.

A Case of Traumatic Ophthalmoplegia.

DR. RAUGE (Challes).—Fall on the left parietal region. Classical signs of fracture of the base (coma, vomiting, otorrhagia, and persistent deafness on the left side). One month after the accident, the parents noted observances in the left eye. Nothing abnormal in looking to the right or straight forward. In looking to the left, insufficiency of abduction in the left eye. No conjugate insufficiency of adduction of the right eye, but on the contrary, secondary deviation of this eye inward. False projection to the left for the left eye. Ocular vertigo, homonymous diplopia. Progressive diminution and disappearance of the ocular motor disturbances in two months.

This was then a limited paralysis of abduction of the left eye without conjugate paralysis of adduction of the right eye.

The anatomical diagnosis would seem to be the following: 1st, *Muscular localisation*; insolated paralysis of the left external rectus. 2d, *Nervous localisation*; lesion of the sixth pair not involving its nucleus (integrity of the internal rectus of the opposite side)

but the nerve trunk, probably near the point where the external motor surrounds the apex of the petrous portion of the temporal bone (otorrhagia, auditory disturbances). 3d, *Probable nature of the lesion*; compression of the external motor by a callous from a fracture of the petrous portion of the temporal bone (late appearance and progressive disappearance of the paralysis).

BERLIN MEDICAL SOCIETY

Session of October 23, 1895.

Filaria of the Eye.

DR. HIRSCHBERG.—This was a case of filaria (*filaria loa*) which was extracted from the eye of a negro. It was situated between the conjunctiva and the sclera. It was recognized as a female worm by its rounded head and pointed tail. In the last century a French physician, Vigo, while travelling in the province of Angola noticed that this worm was frequently present in the eyes of negroes.

Vigo performed five operations for its removal, two of which were successful. He introduced a curved needle between the worm and the sclera and pressed on the worm with this needle so as to force it out through the conjunctiva.

The parasite which I show you is 32 to 33 millimetres in length, and differs from the filaria of Medine.

During the present century, a physician of the French navy removed a similar parasite from the eye of a Congro negro. Another physician at Gabon observed analogous cases and claims to have found that the worm could emigrate from one eye to the other by a sub-cutaneous route around the root of the nose. He stated that the patient could feel the passage of the parasite, and that there was intense pain when the worm approached the cornea, into which, however, it never penetrated.

This parasite was also observed in America and in the Antilles at the time when slaves were imported. Europeans who reside, or who have resided, in countries where this parasite exists may also be bearers of it. A Scotch woman, thirty-two years of age, who had lived at the Mission Station of Old Calabar, in the northwest of Cameron, found, on her return to Europe, that she had a worm in her eye and felt it pass from one eye to the other. It was extracted by Robertson.

The mechanism of the introduction of the worm into the eye is .

not known. It is said that mosquitoes swallow the larvæ of this parasite with the blood which they suck, and that they develop in the insect and are then introduced into water.

The worm exists in endemic condition from Angola to Gabon, from the fifth degree of north latitude to the tenth degree of south latitude on the west coast of Africa.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

The Ophthalmic Review

Reviewed by Dr. V. MORAX.

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March.

I.—A Case of Posterior Lenticonus, by Mr. W. SYM.

A woman fifty-two years old having in the right eye M — —9D, vision normal; with the left eye counted fingers at 2 metres with —15D. It was only on the left side that the peculiar skiascopic signs of posterior lenticonus were found. There were neither lens opacities nor remnants of the hyaloid artery. The author concludes from the reflex on the posterior of the lens that there was an increase in the convexity of the the posterior part of the lens.

II.—Visual Disturbance Caused by Observation of a Solar Eclipse, by Mr. BARRETT.

The case was that of a girl seventeen years old who had looked at the sun through colored glasses, and who, fifteen days later, perceived a slight disturbance of vision. Perimetrical examination revealed a central scotoma 4 by 3 millimetres (measured at 50 centimetres) in the left eye. In spite of this scotoma vision was normal. No ophthalmoscopic lesions. Three months later the visual trouble was the same.

April.

I.—Amaurosis following Injuries of the Skull; Hemorrhages into the Sheath of the Optic Nerve, by Mr. NETTLESHIP.

Nettleship reports the observation of three patients who, as the result of injury of the skull, presented monocular amaurosis,

which, after lasting a few weeks, disappeared progressively. The author states that there was in these cases a hemorrhage into the sheath of the optic nerve.

He does not consider the possibility of hystero-traumatic amaurosis; the appearance of visual disturbance two hours or several days after an accident should lead one to think of the possibility of such an etiology.

II.—On the Use of Large Probes in the Treatment of Lachrymal Obstruction, by Mr. SIMON SNELL.

Snell has for sixteen years used large probes in probing the lachrymal ducts, and has obtained very good results. After incision of lachrymal canaliculus, he introduces sounds of 1.5 and 2 or 3 millimetres. On the next day he introduces the largest probe used, and then the next lower number. After that his probings are at intervals of two, four, and eight days for four or five weeks. It is not necessary to use 4 millimetre probes, but 3 and 3.5 millimetre probes are necessary.

III.—Removal of Grains of Powder from the Cornea and from the Skin by the Galvano-Cautery, by Mr. JACKSON.

Jackson has, in several cases, employed the fine point of a galvano-cautery to remove the incrustations caused by grains of powder. Such an operation should be performed as short a time as possible after the accident.

May.

A Case of Spontaneous Recovery from Pterygium, by Mr. KENNETH SCOTT.

Scott did not observe the pterygium, and the existence of this lesion rests only on the statement of the patient and the presence of a corneal cicatrix.

June.

I.—Which Lachrymal Canaliculus Should Be Incised for Probing the Nasal Canal? by Mr. STORY.

The author recommends incision of the superior lachrymal canaliculus, as this is never followed by epiphora.

II.—Method for Advancement of a Rectus Muscle, by Mr. FREELAND FERGUS.

After instillation and subconjunctival injection of cocaine, Fergus makes two horizontal incisions of the conjunctiva corresponding

to the upper and lower borders of the muscle to be advanced extending from the corner to the angle of the lids. A strabismus hook is introduced under the tendon so as to free it. Two sutures on fine needles are then inserted; one being introduced through the center of the flap containing the muscle, by the upper conjunctival incision, the other being inserted through the lower conjunctival incision. Then each thread is tied so as to include half the muscle and the conjunctiva. The muscle is then cut in front of the knots and the sutures are passed through the tendon, bringing them out above and below the cornea. The operation is completed by tying the sutures.

July.

I.—A Case of Nasal Hemianopsia, by Mr. EALE.

This was an atypical case of nephritic neuro-retinitis. There were valvular lesions in the heart, renal disturbances not well characterized.

II.—The Condition of the Pupil following Cataract Extraction, by Mr. SCHNEIDEMANN.

The author has noticed that in cases operated upon for cataract the upper portion of the pupil is the most transparent, although the lower portion is the most useful for vision. To avoid this inconvenience he advises applying the cystitome horizontally underneath the center of the pupil and then dividing the upper flap of the capsule with a Graefe knife.

August.

I.—Erythroptia, by Dr. FUCHS.

(See *Annales d'Oculistique*, Vol. CXIV., p. 30.)

II.—The Influence of the Brain and Cerebellum on Ocular Movements, by Mr. RUSSEL.

(See *Annales d'Oculistique*, Vol. CXIV., p. 239.)

III.—Hereditary Congenital Nystagmus associated with Movements of the Head, by Mr. MACGILLIVRAY.

(See *Annales d'Oculistique*, Vol. CXIV., p. 238.)

September.

I.—Subjective Methods of Optometry, by Dr. BULL.

It is impossible to neglect subjective methods of optometry, but

they are exposed to certain errors, especially in the determination of astigmatism.

Bull gives the following rules for the purpose of avoiding these errors as far as possible: Before endeavoring to correct the general ametropia the weakest meridian of refraction is sought. This is rendered slightly myopic and then the astigmatism is exactly determined with a concave cylindrical glass with horizontal axis. Then, the cylindrical glass being fixed, the correction of the general ametropia is completed by finding the spherical glass according to the ordinary rules.

In other words, the astigmatism is rendered myopic and then measured at the *punctum remotum*.

II.—Sarcoma of the Choroid in Children, by Mr. GRIFFITH.

(See *Annales d'Oculistique*, Vol. CXIV., p. 238.)

III.—Radical Operation for Trichiasis, by Mr. KENNETH SCOTT.

The operation practiced by Kenneth Scott consists in making an incision of the tarsal cartilage on the conjunctival surface parallel to and but 2 millimetres removed from the palpebral border. The incision should include the entire extent of the lid and should completely divide the tarsus respecting only the skin. The ciliary border is then turned outward and fixed at three points by silver wire sutures on the cutaneous surface of the lid.

He has obtained excellent results from this simple operative procedure.

IV.—BOOK NOTICES

BOOKS AND THESES

Precis de Therapeutique Ophthalmologique, by Drs. LANDOLT and GYGAX. (Masson, Ed. Paris, 1895.)

The object of these authors has been to place in the hands of the oculist a *vade mecum* containing in concise form the indispensable ideas of special therapeutics.

The pharmaceutical part, the dosage of certain remedies, their best form of administration, etc., being facts which escape the physician's memory more readily than in general therapeutics, special attention has been given to the medicinal formulæ, which have been arranged with great care. Finally, in order to render the consulta-

tion of the manual as simple as possible, the articles are arranged in alphabetical order. The book is a very convenient repertory in which the desired indications may be readily found, whether they are sought under the name of the ocular affection or whether it is desired to know the uses of a particular form of medication. The practical contents of this little book and its particular form, for it may be carried in the pocket, will make it a convenient companion for every practitioner.—V.

Sur le Trachome, by Dr. E. E. BLAUW. (*Amsterdam Thesis*, 1895.)

Before giving the results of his observations, the author discusses the theories of Fuchs, Michel, Venneman, Knies, Vossius, Cohn, de Wecker, Gayet, and Panas.

The first conclusion, according to the majority of these authors, is that trachoma is a specific disease which is contagious from the secretion always accompanying it; then, that an acute and chronic form may be distinguished; that trachoma is very rare in children under ten years of age (except according to Fuchs, who has found it in very young children in Egypt), and finally that isolation is the only means of action against the propagation of this disease.

From observations made at the ophthalmic hospital at Amsterdam, Dr. Blauw reaches conclusions quite contrary to those of the above-named authors. They are: 1st, that trachoma may occur wherever hygienic conditions are defective, and that the existence of a microbial cause cannot be granted; 2d, that true trachoma has no secretion, and that if there is secretion, it arises from an accompanying catarrh; 3d, that true trachoma is not contagious, and that the secretion from a trachomatous eye will only produce a simple catarrh in a healthy eye. He states, however, that any catarrh may be the cause of trachoma from prolonged irritation.

On examining all the Jewish children in some of the schools of Amsterdam, he frequently found trachoma in children under six years of age.

For these reasons he considers isolation of patients suffering from trachoma without catarrh as superfluous, but he is of the opinion that all children with ocular catarrh should be removed from school. This rule is followed at Amsterdam.

As treatment he recommends especially improvement of the hygienic conditions, strengthening the general health and treating the catarrh with nitrate of silver, or, in some cases, by excision of the fornix, from which he has seen good results.—H. Snellen.

Contribution à l'examen fonctionnel de la périphérie de la rétine; périmétrie du sens lumineux (Contribution to the functional examination of the periphery of the retina; perimetry of the luminous sense), by Dr. A. SENN. (*Berlin Thesis*, 1895.)

In this interesting article, written under the direction of Professor Pflueger (of Berne), the author makes a special study of the extent and the perimetrical modifications of the luminous sense. The experiments were made with Pflueger's perimeter, the surface of which is painted neutral gray. After determining the extent of the visual field for white, Senn had a gray shade painted holding the medium position, in illuminating power and white value, between white and the gray tone (Hegg's neutral gray) (1) of the perimeter. He then established a series of shades of gray corresponding to the designations $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, white being considered as equal to 1 and gray to 16. The medium gray therefore corresponded to $\frac{1}{4}$. The perimetrical limits of this medium gray are absolutely identical with those of white. The shade $\frac{1}{4}$ is the limiting shade, with which a visual field is obtained as extensive as with white, while with the shades $\frac{1}{8}$, $\frac{1}{16}$, and $\frac{1}{2}$ an appreciable narrowing of the field is observed. Hence, Senn designates this as *limiting gray* (*Grenzgrau*). The determination of the visual field with this limiting gray is quite as rapid as with white. In fact, in peripheral vision the limiting gray appears on the neutral gray background as white, while in central vision the two shades are scarcely differentiated. This is a practical confirmation of the opinions of Aubert and Treitel that the periphery of the retina adapts itself much more rapidly than the central portions, and consequently the examination of the peripheral luminous sense is of greater practical importance than examination of the central luminous sense. Senn has applied this method of examination to a large number of clinical cases, comparing the visual field for white with that for "limiting gray," and he arrives at the following general conclusions.

1st. Examination of the peripheral luminous sense should not be neglected in cases of affection of the optic nerve, the retina or the choroid.

2d. In all forms of affection of these organs the luminous sense is altered. As Treitel has already shown for the central luminous

(1) In an article by Hegg, *La périmétrie des Couleurs* (*Annales d'Oculistique*, Vol. CIX, p. 77, 1893), a description will be found of Pflueger's perimeter and a definition of neutral gray.

sense, its diminution is not a sign especially pertaining to certain amblyopias, but it constitutes a symptom of reduction of functional activity of the visual sense as well as of reduction of the visual acuity and of the chromatic sensitiveness.

3d. Diminution of the peripheral luminous sense is one of the first symptoms of affections of the fundus of the eye. This may be found in cases where the visual acuity and the chromatic sense are still intact. Functional examination of the peripheral luminous sensitiveness is of especial importance in reaching an early diagnosis.

4th. Alterations of the peripheral luminous sense vary considerably from the point of view of their intensity. The weaker variations indicate alterations in the optic nerve; the greater ones, different forms of glaucoma as well as affections of the retina and of the choroid. These latter in particular seem to be accompanied with marked modifications of the luminous sense.

5th. From the practical standpoint the simplest method of examination of the peripheral luminous sense consists in making a perimetrical examination with "limiting gray."

6th. The extent of the visual field for "limiting gray" should first be established: if it is normal, any other perimetrical examination would be of no avail.

7th. If there is doubt as to the reality of a contraction, white always furnishes an easy method of control. If the difference in extent exceeds 2° to 3° one should conclude that there is a disturbance of the luminous sense.

8th. Every contraction of the field of vision for limiting gray should be considered suspicious, and in such cases an examination should be made of the chromatic sensitiveness, of the visual acuity and of the central luminous sense.

9th. Control experiments between white and limiting gray enable one to appreciate with certainty disturbances of the chromatic function by putting in evidence corresponding slight contractions.

10th. Comparison of the visual fields for white and for limiting gray permit one to draw valuable conclusions as to the intensity and the prognosis of the affection.

11th. Less marked variations of the luminous sense may be studied by the use of the intermediate shades between white and limiting gray. Four shades are useful: white and gray, $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$.

12th. In localized affections with formation of scotomas examination with limiting gray gives an exact picture of the extent of the lesion such as can be furnished by no other process.

13th. Comparative examination with limiting gray and white in cases of traumatic neurosis, hysterical amblyopia, neurasthenia, etc., may be very useful and are of value in excluding simulation.

14. These researches can only be of value if they are conducted with instruments and under conditions concordant with the exigencies of physiology. Outside of the construction of the perimeter the most important point rests in the preparation of the indices and the neutral gray tint of the perimeter.—MORAX.

MEDICAL JOURNALS.

The Danger of Sublimate Lotions and Applications of Nitrate of Silver as Prophylactic Method with Premature Children; Fibrinous Conjunctivitis of Chemical Origin; Recovery, by Dr. VAN DEN BERGH. (*La Presse médicale belge*, August 13.)

The writer reports a case in which $\frac{1}{1000}$ lotions of sublimate during delivery, and afterward the application of Crede's method, that is, the introduction of a 2% solution of nitrate of silver into the conjunctival culs-de-sac, were followed by the development of severe fibrinous conjunctivitis which nearly caused the loss of both corneæ. He concludes that in the prophylaxis of ophthalmia of the new-born caustic substances, such as nitrate of silver, or those which are not well tolerated by the conjunctivæ of children, such as lotions of sublimate, should be proscribed.

This rule should be absolute in children who are weak and sickly and those who are qualified as premature.

As prophylactic agent he prefers iodoform as recommended by Valude.—V.

Amaurosis Produced by Male Fern, by Dr. VAN AUBEL (Liege). (*Scalpel*, October 6, 1895.)

My experience, says the writer, shows that the amaurotic effect of male fern arises from the filicic acid. The stimulation produced by this agent on the central nervous system, and especially on the spinal cord, may also extend to the sympathetic system, causing dilatation of the pupils and provoking stimulation of the vaso-motor nerves which gives rise to contraction of the central arteries of the retina. This explanation would suggest that strychnine and nitrite of amyl might be advantageously employed to combat the effects of this form of medication.

The etherial extract and filicic acid, one of its active principles, exercise a harmful influence on the liver and the kidneys and it is preferable only to use the essence, another active principle of male fern. Furthermore, the essence is well tolerated by the higher animals.—DASTOT.

V.—MISCELLANY

The Belgian Society of Gynecology and Obstetrics have just requested that hereafter midwives shall be placed under the active supervision of competent authorities.

Among other things, they desire that these women shall be compelled to summon a physician as soon as the least sign of purulent ophthalmia appears in a child.

ANNALES D'OCULISTIQUE

Volume CXIV.—Number 6.

DECEMBER, 1895.

I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

SKIASCOPY

By Dr. **Bardelli**, of the University of Sienna. With notes by Professor **GUAITA**.

SYNONYMS.—*Cuignet*: keratoscopy; *Juler* and *Parent*: rétinoscopia; *Landolt*: pupiloscopy; *Galezowski*: dioptroscopy; *Chivret*: fantoscopy; *Pflugger*, *Chibret*, *Chouet*: skiascopy; *Monoyer*: scotoscopy; *Ziemiński*: retinoskiascopy; *Leroy*: pupiloskiascopy; *Saad-Sameh*: phantoscopy; *Schweiger*: beleuchtungsprobe; *Fick*: shattenprobe; *Parent*: ophthalmophantoscopy and ophthalmoskiascopy.

The school of Sienna prefers the name skiascopy because it is the most generic, and while indicating the fact with precision it is built upon no theoretical speculation.

Practice of Skiascopy.—The practice of skiascopy is too well-known to require description here. To recall a few details will suffice.

Preference is given, in general, to a rather large plane mirror. In the clinic at Sienna a plane mirror, 6 centimetres in diameter, is employed. With this mirror the displacement of the shadow is in the same direction as the movement of the mirror when the *punctum remotum* of the observed eye is behind the eye of the observer; in the opposite direction when, on the other hand, it is in front of it. With a concave mirror the phe-

nomenon is the same when the observed eye is between the focus of the mirror and the observer; it is in the opposite direction when the focus of the mirror is between the observed eye and the observer. The plane mirror, however, has the advantage that the effects arising from the distance between the observed and the observer are less experienced in the production of the phenomena. Furthermore, variations in the luminous intensity of the pupil reflex are more noticeable, better graduated and more constant and are consequently better appreciated.

The regard of the subject should be directed to a distant point, in order that the accommodation may be relaxed.

If the subject under examination should be requested to look directly into the eye of the observer, the refraction would be determined exactly on the visual axis, which would be desirable; but with this procedure accommodation of the observed eye would be brought into play and excessive illumination would cause contraction of the pupil. But in the position of regard indicated, the observed may completely relax his accommodation, and light projected into the eye passing over the border of the pupil will strike the *punctum cæcum* and there will be neither dazzling nor contraction of the pupil. The luminous reflex is also more intense since it is furnished by the surface of the disk, which is clearer and more brilliant than the macula.

In general terms the exactness of observation will be the greater as the observer is stationed farther from the observed; at a given linear distance there is in fact a corresponding dioptric value which is the greater as the observer and the observed are nearer to each other. By adopting 1 metre as the distance the calculation will be simplified and the possible error will only be a small fraction of a dioptre.

I refrain from giving the results obtained from a large number of observations since it would be superfluous and as the advantages of the method are not under discussion. I propose simply to discuss some general considerations. I have stated that among persons of intelligence when one is directed to look at

a distant point the accommodation is diminished, and sometimes there is a partial or complete relaxation of the contraction which is habitual in young hypermetropic subjects (1).

Explanation of the Phenomena of Skiascopy.—The course marked out by me in this article, and which has been suggested to me by Professor Guaita, has been to demonstrate experimentally the principles on which skiascopy is based, and to determine which of the theories advanced in explanation of the phenomena is most exact (2).

To account for the manner in which the phenomena of skiascopy are produced, I shall pass in review a few optical laws in order to apply them to this special case and control the deductions by experiment.

Field of Illumination.—It is necessary first of all to know in what way the fundus of the eye is illuminated in skiascopic examination, to know what is the field of illumination on the retina and what are the movements of this field in relation to those of the mirror. Let us consider the course of the luminous rays which penetrate the refractive media of an eye, the accom-

(1) From several experiments I am convinced that skiascopy gives also in young subjects, almost always with close approximation, the total hypermetropia in cases of hypermetropia of low or moderate degrees even without the use of atropine. When the hypermetropia is of high degree, part of the spasm of accommodation persists, and it is always advisable to paralyze accommodation. In the determination of astigmatism, skiascopy almost always results in eliminating the effects of accommodation. Thus in one young man I determined by skiascopy, without atropinisation, a compound myopic astigmatism and the result was confirmed by examination made after atropinisation. With another young man with compound hypermetropic astigmatism, I determined with precision an astigmatism of 5 dioptres, but 5 more dioptres in all meridians was concealed by an effort of accommodation. (L. GUAITA.)

(2) Nearly all the present theories of skiascopy originate from geometric construction or algebraic calculation. Without desiring to detract from the importance of geometry and algebra, on the contrary recognizing that they are necessary to give a satisfactory explanation of the phenomena of dioptrics, I wish to state that theories should also be based on facts and experimental observation. In absence of this even the most exact calculations and constructions may lead to uncertain and refutable results. This reflection led me to advise Dr. Bardelli to enter upon this experimental demonstration. Of these experiments, some were devised by himself and others suggested by me. The results would seem quite satisfactory to establish a simple, clear and certain theory for the skiascopic phenomena which is nothing more than a further modified and simplified demonstration of Parent's theory. (L. GUAITA.)

modation of which is totally relaxed. If the luminous rays which reach an emmetropic eye were to start from the anterior focus of the eye, they would reach the retina as parallel rays and would illuminate a part of the fundus of the eye, the dimensions of which would be determined by the dimensions of the pupil. But as the luminous source is within the anterior focus of the eye there will be a conjugate focus and the rays which penetrate the eye will assume a convergent direction and will form on the retina a circle of diffusion, the smaller in proportion as the luminous source is further away. When the luminous source is at an infinite distance, that is to say, when the rays reach the eye with a parallel direction, they unite on the retina to form a sharp image. In a myopic eye, on the other hand, a sharp image is only formed when the luminous source is at the P. R., and the image is diffuse whenever the luminous source is within or beyond that point.

In a hypermetropic eye, on the contrary, a sharp image is only given by convergent rays. When, however, the luminous source coincides with the P. R., the illuminated portion of the retina corresponds exactly with the image of the luminous source. But in all other cases, the luminous rays join on one side or the other of the retina, and there is no longer a sharp image of the luminous source on the retina, but circles of diffusion which vary with the amplitude of the pupil; in this case we may say that *the field of illumination on the retina only represents the projection of the pupillary opening of the observed eye.*

[The form of the field of illumination on the retina is identical with the form of the pupil; but its size, the distance from the luminous source being the same, varies according to the quality of refraction of the eye, and its luminous intensity is in inverse ratio to its size. In general the field of illumination is the greater and less intense as the error of refraction is greater. When the rays which penetrate an eye do not cross in front of the retina (H) the image of the field of illumination is erect, and in the opposite case (M) the image is inverted. When the

luminous source coincides with the P. R. of the observed eye the field of illumination no longer retains the form of the pupil, but it is a sharp image inverted and reduced of the luminous source, and this gives the greatest intensity.

All these modifications of the field of illumination have been verified on Kühne's schematic eye by placing it in an iris with a lozenge-shaped pupillary opening, the longest diagonal being directed horizontally, and placing on its axis a lighted candle at a distance of 2 metres in front of the summit of the cornea (1).

Placing the ground glass, which represents the retina, quite near the posterior surface of the lens—that is to say, simulating a high degree of hypermetropia, there is formed on it a luminous image, the form of which is precisely the same as that of the pupil, but slightly smaller and having the same direction. In proportion as the ground glass is carried farther away, the lozenge becomes smaller and smaller, and at a certain point the outlines begin to become diffuse and the angles rounded. An image of the light then begins to appear surrounded by circles of diffusion (2) and this becomes clearer and clearer until it is perfectly sharp. It is inverted and very small. The ground glass then represents the distance of the conjugate focus from the flame—that is to say, the *punctum*

(1) The candle might have been placed at 1 metre in front of the anterior nodal point, for then the posterior nodal point of the eye would have been the same as for a 1 dioptric myopic eye, which is taken as a type in skiascopy. But as the field of illumination was under consideration 2 metres were chosen, so that the same conditions would exist as in practical skiascopy, where the light, placed near the observed eye and directed into it by a mirror, which is at a distance of 1 metre, appears to be 2 metres away.

(2) This zone of indecision in the form of the field of illumination is one of the reasons why, near the neutral point, when the shadow hardly begins to appear, the phenomena of skiascopy are not distinct. This fact has also been determined by Dr. Parent, who calls this the zone of *bad observation*, and gives as a cause the circles of diffusion which form on the retina of the observer, because the *punctum remotum* is very near the observed eye. When for skiascopy a luminous source limited by a round diaphragm is employed, the zone of bad observation diminishes still more; if it does not disappear completely, it is because other factors exist, as will be seen later. This fact also goes to prove that the cause of the phenomenon given by me may be the true one.

remotum of the eye, and in this case the refraction corresponds to 0.50 dioptries. On removing the ground glass still farther from the lens and thus rendering the eye myopic, a small lozenge-shaped figure again begins to appear, but the angles are placed at directly opposite points to those which they in reality occupy in the pupil. The farther the ground glass is carried away, the greater does this lozenge become until it exceeds the dimensions of the pupil, but its luminous intensity decreases more and more.

All these variations in regard to the size and intensity of the field of illumination according to the condition of refraction of the eye may be fixed with exactness for the human eye by calculation, but this would have no practical importance. It is sufficient to conclude that the size of the field of illumination being dependent on the diameter of the pupil, the latter should be suitably dilated, so as to facilitate skiascopic examination.

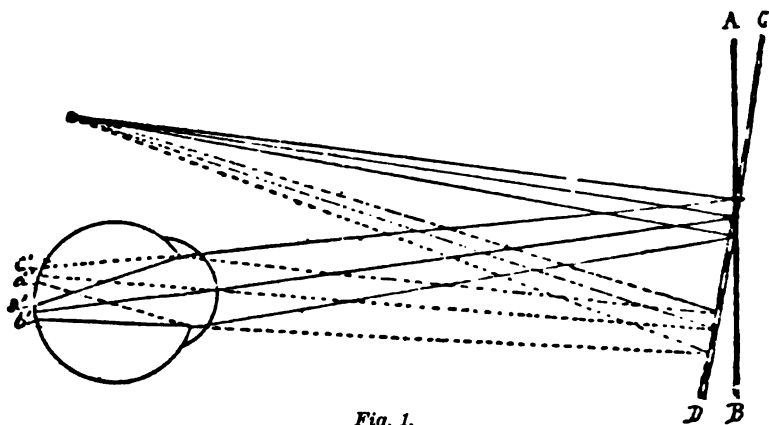


Fig. 1.

When the pupil is very much contracted, the field of illumination is very small (a fact which is also true of the field of examination, as will be shortly shown), and skiascopy is impossible. When the pupil is greatly dilated, skiascopy may still be performed, but the phenomena are presented with less exactness. A moderate dilatation of 5 millimetres is the best.] (The above insertion by Professor Guaita.)

What is the reason for the displacement of the field of illumination on the retina when movements are given to the mirror?

The mirror in the position $A B$ (*Fig. 1*) illuminates the surface $a' b'$, but in the position $C D$ it illuminates the surface $c' d'$, and the displacement of this luminous image on the retina is entirely independent of the condition of refraction of the observed eye. This fact has been demonstrated experimentally by repeating Magendie's experiment and applying it to the present case.

A fresh eye from a white rabbit was taken, and after uncovering the sclera, it was placed on the support of a specially constructed apparatus with its posterior pole applied to the opening d (*Fig. 2*). In a dark chamber behind the apparatus one

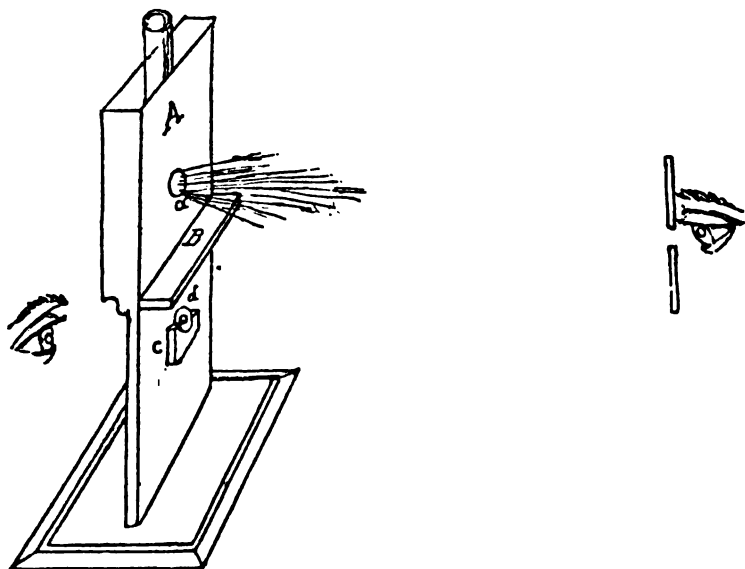


Fig. 2.

observer was situated, while another observer on the opposite side was placed under the desired conditions for performing skiascopy. For the eye under examination the observer performing skiascopy noticed a limited shadow of slight intensity, which was

displaced with the movements of the mirror, and which disappeared on interposition of a $+ 3.25$ D lens. The observer behind the apparatus, who consequently observed the posterior pole of the eye through the opening (d) through the scleral coat, saw on the fundus of the eye a circumscribed luminous point which followed the movements of the mirror. If the eye was rendered myopic or hypermetropic by the use of glasses up to ± 18 D, it was noticed that with corresponding movement of the mirror the same displacement of the luminous point always occurred on the fundus of the eye. These experiments were repeated with the eyes of oxen, pigs, and sheep, and the results were always the same.

The field of illumination moves, then, on the retina, always in the opposite direction to the luminous source, whatever be the condition of refraction of the observed eye. Referring this movement to the plane mirror, as the light moves in the opposite direction to the movements of the latter, we are able to establish the fact that the field of illumination in the eye under skiascopic examination is always displaced in the same direction as the rotary movements given to the plane mirror.

Field of Examination.—[Parent and others have applied to skiascopy the principle advanced by Helmholtz that the ophthalmoscopic field is determined by the image of the observer's pupil, which is formed on the retina of the observed. This is in fact quite true for ophthalmoscopic examination in the exact sense of the words, but it is not so when it is applied in a summary and complete manner to the explanation of the phenomena of skiascopy. It should always be remembered that in ophthalmoscopy, as it is ordinarily understood, the observer is situated near the observed and that he endeavors to see the details of the fundus of the eye: he consequently accommodates for the point where the real or virtual image is situated.

In skiascopy the observer is at a much greater distance. He accommodates for the pupil of the observed eye and endeavors to see the phenomena of light and shade which occur within its limits. By means of this accommodation a distinct

image of the pupil of the observed eye is formed on the fundus of the observer's eye, and as the phenomena of skiascopy take place within the field of the pupil of the observed eye, it is that which limits the field of examination (Rüppel) (1).

Strictly speaking, whether one considers the ophthalmoscopic field determined by the image which the pupil of the observer's eye forms on the retina of the observed, or whether by the designation of field of examination it is desired to indicate the image of the pupil of the observed eye formed on the retina of the observer, the difference is quite inappreciable in most cases. It may, however, sometimes be important to thoroughly understand the interpretation to give to this designation, when, for example, eyes with irregular pupils are examined, or when there is an anomaly in the form or diameter of the observer's pupil.

I have, therefore, endeavored to demonstrate experimentally that the field of illumination is furnished by the pupil of the observed eye. From the experiments which I shall describe, and which relate to the theory of the formation of shadows, evidence is given that the pupil of the observer has no influence on the field of examination. To obtain a direct demonstration, I advised Dr. Bardelli to perform a skiascopic examination with an eye under the influence of eserine. He has a myopia of — 1.75 D in both eyes, V normal. In the right eye, when the accommodation from eserine was at its maximum, he had M — 5 D. After neutralizing this myopia, he performed a skiascopic examination with his pupil reduced to a small point. He had not seen the patient before. The result of the examination was: 10 D for the right eye, 10 to 11 D for the left. Without being made acquainted with his results, I performed an examination of the same individual immediately afterward, and this examination gave: OD, 10 D; OS, 10 D for the horizontal meridian and — 12 D for the vertical meridian. The pupil of the observer might have some influence in the field

(1) Rüppel also calls this the ophthalmoscopic field. It seems to me that the designation *field of examination* is preferable, for it does not give rise to confusion.

of examination; it might be so contracted that skiascopic observation would be impossible. And in fact, the contrary being true, we could not perform skiascopy on subjects in a condition of myosis.

The field of examination being thus determined in skiascopy, it follows that the field of illumination and the field of examination are identical, coinciding in form and in dimensions as well on the retina of the observed as on his pupil. In fact, the two considered in the interior of the observed eye are represented by a cone (round pupil), the base of which is the pupil, and the summit in the point where the rays, which penetrate or leave the eye, cross, or should cross, and consequently the sections of these two equal cones are always similar in whatever plane they are considered. The two fields vary with the condition of refraction of the observed eye, but as they vary together and in the same manner, they are always the same for the same eye.

This coincidence of the field of examination with the field of illumination ceases as soon as the luminous source, forming a conjugate focus on the retina of the observer, forms there a distinct and inverted image, and the eye of the observer is at the P. R. of the observed eye; in this case the projection of the pupil on the retina of the observed eye, which corresponds to the field of examination, is represented by the summit of the cone, and the field of illumination is figured by a small punctiform disc, smaller than the image of the light. Under these conditions the shadow cannot be formed, and the pupil is illuminated or darkened suddenly, appearing, however, more or less illuminated as the field of examination is more or less illuminated by the flame.

In order that the two cones may be perfectly equal, it is also necessary that the distance from the luminous source coincide with the P. R. of the observed eye, and in practice this exactness should not be carried to mathematical limits. The luminous source placed near the observed and reflected by a plane mirror, which is at a distance of 1 metre, appears to be 2 metres away from the observed, and sends the rays which

reach the observed eye with a divergence similar to that which would exist for an eye with myopia 0.50 D, and at the same time the observer, who is at a distance of 1 metre, is only at the P. R. of the observed eye in case the latter has a myopia of 1 D.

If the luminous source and the observer could be placed at an infinite distance (5 to 6 metres would be sufficient in practice) this difference would be eliminated, and by using a round luminous source there would no longer be for low degrees of ametropia a bad zone of observation, for in these cases delicacy in the examination is more than ever necessary, and the neutral point which corresponds to the ametropia may be determined with far greater exactness and precision. But in practice this is not possible.] (Insertion by Professor Guaita.)

Theory of the Formation of the Shadow.—What is the origin of the shadow which appears in the pupil of the observed eye, of what does it consist, and what is its limiting radius?

Two theories are at present under discussion: those of Leroy and of Parent. All others who have written on skiascopy, and who are not few in number, have but reproduced one or other of these two theories. Dr. Leroy's theory may be represented by recalling the conclusions of his last article on this subject (*Revue Générale d'Ophthalmologie*, July–August, 1887, p. 349).

What the observer perceives as a pupillary shadow is, according to Dr. Leroy, but a shadow of his own pupil on the pupil of the observed eye. All the phenomena of skiascopy are explained by him from this starting point of view. In another point, says the same writer, the curve limit is similar to that which limits the pupil of the observer. A complete explanation with the aid of algebra and geometry has been given quite recently of Dr. Leroy's theory by Dr. Rüppel. Dr. Parent's theory is quite the opposite: taking into consideration the field of illumination and the field of examination and the differences of relation between the two, there result,

according to his view, the various phenomena of skiascopy. Thus, when the field of illumination completely covers the field of examination, the pupil of the observed eye is seen to be illuminated, and when the field of examination of the observer on the retina of the observed eye is no longer entirely covered by a sharp or diffuse image of the luminous zone, a shadow appears, and its extent corresponds to the unilluminated or obscure portion of the field of examination (*Arch. d'Ophthal.*, 1891, p. 578). All the phenomena take place on the retina, and it is due to a well-known optical illusion that we refer to the pupillary plane of the observed eye what is seen either as a real or virtual image of the fundus of the eye (*ibid.*, p. 542). As may be readily understood, these two theories, although they are geometrically controlled, are so different that it is impossible to reconcile them. Here, then, experimental observation is of great value in determining which of the two theories is justified by facts.

I commenced my experiments with a photographic apparatus 13 x 18, carrying an objective in which the distance from the convex surface of the anterior lens to the principal focus of the objective system was 0.185 m. To the ground glass of the apparatus was attached a translucent paper of bright red color. I was much gratified to be able to reproduce all the phenomena of skiascopy with an opening corresponding to emmetropia, and either by causing the ground glass to approach or to recede, to obtain conditions similar to myopia or hypermetropia. I did not always hold to the distance of 1 metre, but in order to approach as nearly as possible to reality, I found the relation between the focal length of the eye and the distance at which skiascopic examination is made with the focal distance of the system adopted and the distance at which examination should be made:

$$\begin{aligned} 22.83 \text{ mm.} : 1 \text{ m.} :: 185 \text{ mm.} : x \\ x = 8.10 \text{ m.} \end{aligned}$$

In this way I was able to reproduce all the phenomena of

skiascopy, but did not succeed in gaining anything in support of either one of these two theories. I thought that if Dr. Leroy's theory were true, the shadow and its form would be changed by variations occurring in the pupil of the observer, the latter being entirely independent of the changes of the pupil of the observed eye. The following experiments were then performed :

(a) Kühne's schematic eye was placed at a distance from the posterior surface of the lens, so that it received a sharp image of objects placed at about 15 millimetres. The observer was stationed at a distance of 1 metre (1), used a plane mirror, 6 centimetres in diameter, and a luminous source with a 5 centimetre diaphragm placed above. In the eye the circular diaphragm was replaced by a lozenge-shaped diaphragm, the longest diagonal of which was 33 millimetres and the shortest 27 millimetres. The longest diameter corresponded to the horizontal meridian of the lens, the acute angle being at the right of the observer. The ground glass was placed 112 millimetres from the centre of the posterior surface of the lens, and was covered with red translucent paper.

In this case, the Kühne eye being accommodated for a great distance (15 millimetres), it represented a hypermetropic eye with accommodation at rest. Skiascopy was then performed, and the observer remarked a well-illuminated red field of lozenge shape. On imparting movements to the mirror, a shadow was noticed quite similar in form to the opening of the diaphragm and moving in the same direction as the mirror: namely, when the mirror was turned from right to left, a shadow at the acute angle was seen, which moved from right to left.

On placing a + 1 D lens before the eye, it was noticed that the field was still illuminated and red in color, but the illumination was more brilliant. On imparting movements to the mir-

(1) I also experimented at a distance of 6 metres, in accordance with the calculation of which I have just spoken. The results were the same, but the execution more difficult.

ror, the luminous field faded, and then became dark without a shadow. The P. R. of Kühne's eye was then coincident with the anterior focus of the observer's eye (neutral point).

If the ground glass was moved nearer the lens—that is to say, if the eye was rendered hypermetropic, the lozenge-shaped opening was less illuminated, the angular shadow was displaced in the same sense as the mirror, and its movement was slower. When the ground glass was very near the lens (H of high degree), the shadow was scarcely displaced.

If now the ground glass was moved back of the position which it occupied at the commencement of the experiment, a point was reached where the image which was formed on the glass was no longer a lozenge, but a sharp image of the flame. It is this which is observed in an emmetropic eye which is accommodated for the light. The observer notices that in this case the lozenge-shaped diaphragm has no influence on the form of the shadow; he sees the inverted image of the light in the field of examination, which is displaced with the movements of the mirror. He should consider the light and not the shadow, which does not, in fact, exist.

On drawing the ground glass farther back, a position is reached where the entire field is brilliantly illuminated with a red color. On communicating movements to the mirror, the luminous intensity of the field becomes less intense, and one passes to darkness without perceiving any part in the shadow. Kühne's eye is evidently placed under the conditions of a myopic eye of 1 dioptré, and the observer is at the neutral point. By placing a 1 D lens before the eye, the same phenomenon is again seen as in the first stage of these experiments.

If the ground glass is carried still farther back, the luminous intensity is seen to diminish and an angular shadow appears, which is displaced in the opposite sense and the movements of which are slower.

The form of the shadow is always that of the portion which it occupies in the pupil.

On the ground glass a luminous lozenge-shaped surface is out-

lined with acute angle at the left of the observer and obtuse angle at the right. If the observer moves the mirror from right to left, a shadow at the acute angle is seen to appear from right to left.

On repeating these experiments several times and giving various shapes to the iris it was found that the form of the shadow always represented the form of the pupil of the observed eye.

(b) The pupil of a white rabbit was made triangular by three operations of *irido-encleisis* performed at intervals of several days. It was noticed that on performing skiascopy, the form of the shadow was no longer semi-lunar, but rectilinear when it appeared on the side of the base of the triangle and angular when it appeared at the summit.

With individuals who have undergone iridectomy, it will be seen that the shadow has not sharp limits on the side of the coloboma of the iris, and that it is semi-lunar on the side where the iris has not been touched.

In regard to the pupil of the observer, the following experiment was performed :

(c) On the posterior surface of the ophthalmoscope I placed a diaphragm either lozenge-shaped or quadrangular, the greatest diagonal of which was two millimetres (less than the diameter of my pupil). On looking through this diaphragm, I found that the shadow had the same *form*, the same *intensity* and the same *direction* as when no diaphragm existed on the posterior surface of the ophthalmoscope.

[It seems to me that as a result of the experiments which have just been described and as a result of what I stated before in regard to the field of illumination and examination, a simple and easy theory may be formulated for the phenomena of skiascopy.

The field of illumination and the field of examination coincide with each other in form and extent, and consequently they are perfectly superimposed when their centres coincide with the

visual axis of the observer's eye. When the observer imparts a movement of rotation on its axis to the mirror, the field of illumination is displaced while the field of examination is fixed, and consequently a part of the latter is no longer illuminated; hence, the shadow which appears.

The limits of this shadow are on the peripheral part of the border of the field of examination, which is the form of the pupillary border of the observed eye, and toward the centre of the border of the field of illumination, which in reality reproduces the form of the border of the pupil. This is the reason why, when the form of the pupil is regular and round, the shadow takes the form of a crescent, but if the pupillary border is irregular, the shadow assumes its form.

The formation of the shadow being thus conceived, the movement of this shadow may be easily explained. The field of illumination and the shadow which limits it on the retina always proceed, whatever be the condition of refraction, in the inverse direction to the luminous source, that is, in the same direction as the movement of the plane mirror. But the eye of the observer sees the movement of the field of illumination in the inverse or in the same sense according as the rays which leave the observed eye cross or do not cross before reaching him, and consequently, the common distance being 1 metre, he perceives the movement of the field of illumination in the inverse sense in myopia greater than 1 dioptre, and in the direct sense for myopia less than 1 dioptre, emmetropia and hypermetropia.

Hence, the theory of the skiascopic shadow is the same as the theory of ophthalmoscopic examination with the inverted or the erect image. This may be readily comprehended by examining the constructions of Fig. 3, in which *a* indicates the illuminated portion of the field of examination, and *b* the obscure portion. It remains to explain why the shadow, in whatever direction it is displaced, always has the form of the side of the pupil where it appears. The field of illumination, while it is always displaced on the retina in the inverse direc-

tion to the luminous source, has on the retina the erect form of the pupil when the P. R. of the observed eye is beyond the luminous source, and its inverted form when the P. R. is between the luminous source and the eye. In the first case, the observer's eye sees the erect form of the pupil: in the second, he inverts a second time the already inverted form of the pupil, and consequently makes it erect.] (Insertion by Professor Guaita.)

The limit between the illuminated portion and the shadow is

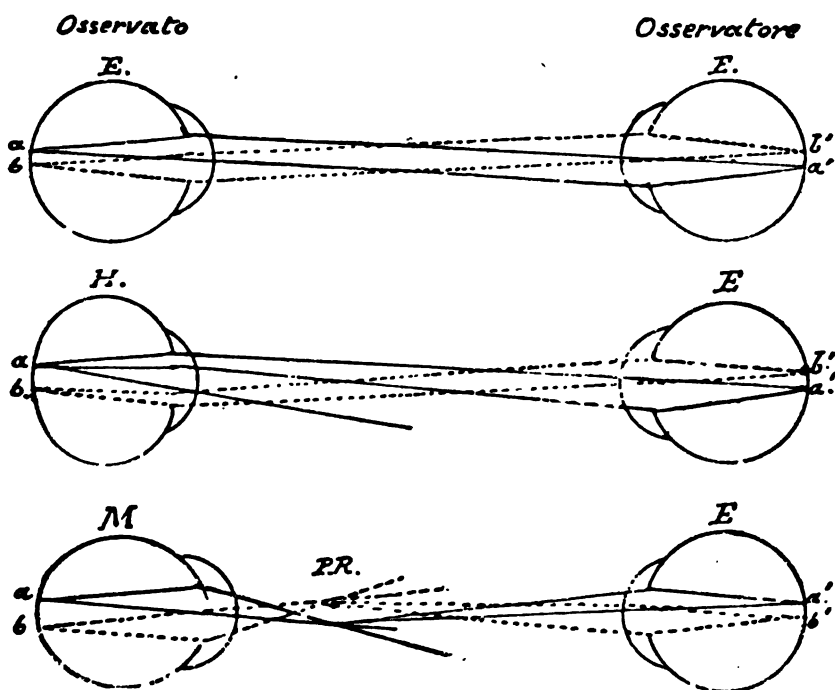


Fig. 3.

given by a curve with a large radius in the emmetropic eye, and in low degree of ametropia; the radius of this curve is, on the contrary, short in high degrees of ametropia. This comes solely from the difference in enlargement, which the dioptric media of the observed eye give to the illuminated por-

tions of the fundus of the eye, according to the different degrees of ametropia.

It is very easy to give an experimental demonstration of this fact.

A small disc of white paper is placed on a black surface (2 millimetres in diameter) and is observed with a lens of high magnifying power at a distance of from 60 to 70 centimetres. When the focus of the lens coincides with the point observed, the dark portion surrounding it is no longer seen; but if the dark surface on which the white disc is placed is displaced to the right or to the left, it will be seen that the field of examination is invaded by a dark portion which has a curve of large radius. By bringing the lens nearer the white disc or carrying it farther away, it will be seen that the white portion is separated from the dark portion by a curve of short radius.

The field of illumination and the shadow which limits it are displaced the more slowly as the ametropia is of higher degree, and for the following reason: the field of examination, independently of the diameter of the pupil and the difference between the observer and the observed, varies with the error of refraction of the observed eye; that is to say, the greater the error of refraction the greater is the extent of the field of examination. We know also that the enlargement of the parts of the retina given by the dioptric media of the eye is very great in an emmetropic eye and in low degrees of ametropia, and that it diminishes as the error of refraction increases.

By applying these facts to the more general case, we may conclude that through pupillary openings of the same size we will have a field of observation sometimes very small (yet enlarged: emmetropia and low degrees of ametropia), sometimes still larger (slightly magnified: high degrees of ametropia). It is quite evident that the shadow will take a longer time to traverse a larger field than a smaller one, and its progress in first case will appear slower.

Luminous Intensity of the Pupillary Reflex.—Apart from the variations which this reflex undergoes in each case on account of the luminous intensity of the source, the more or less considerable refraction of the mirror and the diameter of the pupil, its luminous intensity varies especially with the condition of refraction of the observed eye. In his book, *Instructions pour l'emploi de l'ophthalmoscope*, Bjerrum says:

“If the retinal image of the flame is very diffuse—that is to say, if the circles of diffusion are very great in proportion to the visual angle of the luminous image of the mirror (if their diameter is greater than the extent of the retina of the observed eye in relation to this angle), the retinal image of the light will be more dimly illuminated in its entire extent. The relation is the same as if the luminous source were a point, and the retinal image of a point is the more dimly illuminated according as it is less sharp—that is to say, in proportion as the circle of diffusion which represents it is the greater.”

This is the same explanation that Bjerrum, Chouet, Zieminski, Leroy, Parent, Fick, Bitzos, etc., give of the greater or less brilliancy of the pupil in the different errors of refraction (hence the greater or less intensity of the shadow).

It seems to me that this simple explanation cannot be maintained, and that while fully appreciating it, it is necessary to take into consideration another explanation which I shall give:

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called x), a section made at 1 metre from the source will have the same circumference and physically the same luminous intensity; but if the bundle of luminous rays is divergent, its circumference at 1 metre will no longer be 1, but much greater, it may be, for example, 10 ($x n$), and for a surface equal to 1, the luminous intensity will be $1/10$ (x/n). If, on the contrary, the rays which form the emergent bundle are convergent, we will have the maximum of luminous intensity and the minimum of surface at the point where they meet in the focus. Within or beyond this point, the illuminated surface will increase as the luminous intensity diminishes. Applying these facts to skiascopy, we see that the greatest luminous intensity is attained when the P. R. of the observed eye coincides with the anterior focus of the observer's eye (this condition is realized in skiascopic examination at a distance of 1 metre when the eye is or is rendered myopic 1 dioptré). For an emmetropic eye or a myopic eye -2 D, the luminous intensity is almost the same, and it diminishes in proportion as the error of refraction increases. In the case of a low degree hypermetropia, the luminous intensity will still be considerable, although always less than that of an emmetropic eye, and it will diminish more and more as this error of refraction increases.

But in skiascopy the lens which neutralizes the movement of the shadow is the lens which renders the eye myopic 1 dioptré (the observer being stationed at a distance of 1 metre). It places us, however, in better conditions to appreciate the apparent luminous intensity of the eye. Hence the reason why we may determine errors of refraction even in the case where the pupil of the observed eye seems to be quite dark. When a neutralizing lens is placed before the eye, either because it partially suppresses the circles of diffusion, thus giving rise to a more distinct image of the retina of the observed eye, or because it concentrates the emergent luminous rays at the P. R., we see the pupil brilliantly illuminated.

The Neutral Point.—The neutral point (Parent) in which the skiascopic phenomena can no longer be appreciated is the

point which is sought in skiascopy, as has been seen in the general description. At this point the pupil is brilliant, but passes to obscurity without the production of a shadow when the luminous intensity is progressively diminished.

The explanations which have been given of this phenomenon are many. They are, however, all variations of that given by Parent in his publication in the *Archives d'ophtalmologie*, 1892. Indeed, Parent's explanation has been accepted by the majority of authors (lately also by Bitzos, see *Annales d'oculistique*, May, 1893, p. 361). I do not understand, however, why Parent refers them to the pupillary plane of the observer, and it seems to me that what he says is hardly exact, namely, that the skiascopic phenomena are not observed when the pupillary plane of the observer coincides with the plane of the remote point of the observed eye. This, I say, seems hardly exact, if indeed it is not an error.

To be more precise it should be said: "When the real image of the delineated portion of the retina which is formed at the P. R. of the observed eye coincides with the anterior focus (12.8095 millim. in front of the cornea) of the observer's eye, the retina of the latter only receives a bundle of parallel rays which give rise to a luminous sensation, but not to an

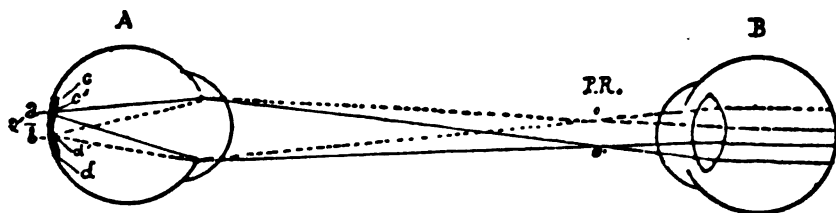


Fig. 4.

image." In fact, suppose A (*Fig. 4*) to be the observed eye, and B the observer's eye (1). If *a, b* represent the portion of the fundus of the eye A. which may be seen by B, *c, d* represent the illuminated portion of the fundus A. If A is myopic

(1) The illuminated portion of the retina of the eye A is much exaggerated in the diagram, so that the arrangement may be better understood. It should in reality be very small and the points *a, o'* should touch.

1 dioptre, and we render it so in skiascopy even when it is not so, the real image $c' d'$ will be found 1 metre distant from it, that is to say, in o . But o is also the anterior focus of the observer's eye, and consequently the pupil will be fully illuminated. The same would be the case if c passed to a and below a ; for example, at a' B would still see the pupil of A fully illuminated, but it would be less intense because the quantity of light concentrated in o would be less. The same could be said when c reached b . Below b the pupil of A would be totally dark. It seems to me that this explanation is quite clear and exact. The reason for the variations in the luminous intensity of the pupil of A is given by the laws of the propagation of luminous cones. The reason for the fact that this pupil is seen at times wholly illuminated, and at other times in complete darkness, is given by the law of the cardinal properties of optical systems (*Roiti, Elem. di fisica*. Vol. II., p. 93).

With Kühne's schematic eye and a photographic apparatus we may demonstrate experimentally the theory of the neutral point which has just been given. Causing Kühne's eye to play the rôle of the observed eye and the photographic camera that of the observer, the apparatus may be arranged in the following manner :

When a luminous source is placed in the interior of Kühne's eye at a distance from the lens which acts as the crystalline lens, so that its image through the lens which represents the cornea will be formed at 1 metre from the latter, we have the conditions of a 1 D myopic eye. After removing the ground glass which is at the P. R. the photographic apparatus (objective of 18.5 cm. focal distance in front of the centre of the surface of the anterior lens of the system) is placed at 18 cm. from the lens, which represents the cornea of Kühne's eye so that the P. R. will coincide with the principal anterior focus of the photographic objective.

If, now, the apparatus is focussed for the anterior pupillary plane of Kühne's eye, and the luminous source is gradually

intercepted with a diaphragm, phenomena will be seen quite similar to those observed at the neutral point; while, carrying the P. R. of Kühne's eye nearer or farther away, a shadow of the diaphragm which intercepts the luminous source may be distinctly seen on the ground glass of the apparatus.

[The theory proposed by Dr. Bardelli to explain the neutral point may be readily comprehended from the following:

All the rays which emerge from the pupil of the observed eye unite at the P. R., and in this position the field of observation is reduced to a single point. Consequently, whether the field of illumination covers the entire field of examination on the retina of the observed eye, or whether their junction is only partial, the P. R. will always be represented by a luminous point, and only variation in respect to its intensity can be obtained. And when the P. R. of the observed eye coincides with the anterior focus of the observer's eye, the latter, and this is an elementary law of optics, will only receive on his retina a bundle of parallel luminous rays. In practice, no appreciable differences are remarked for the junction of the P. R. of the observed eye with the anterior focus, and with pupillary plane of the observer; but the coincidence with the anterior focus gives a more thorough geometrical explanation of the phenomena and is more exact.

What should be thoroughly understood for the neutral point are the conditions necessary for the production of the phenomena which take place at that point. It is necessary that the field of illumination be very intense, and that the field of examination be very small. In practice, these conditions exist when the luminous source forms a sharp or almost sharp image on the retina, and when the P. R. of the observed eye falls in the pupil of the observer's eye, or very near its anterior portion.

If the observer is stationed at the distance of 1 metre, it is necessary that the observed eye be myopic 1 D, in order that its P. R. coincide with the observer's eye. If the observer is stationed at a greater distance, it is necessary that the myopia

be less than 2 metres, for example, 0.50 D. Emmetropia corresponds to infinity, but it is also necessary to carry the source of illumination to an infinite distance.

If 1 D myopic eye be observed at a greater distance than 1 metre, while there will be quite an intense image of the luminous source, the phenomena of the neutral point will be no longer observed, because the field of examination will be too large. An experimental demonstration of this may be given, as will be seen later.] (This insertion, as well as the following, by Professor Guaita.)

[*Experimental Demonstration of the Phenomena of Skiascopy.*—For this demonstration Kühne's eye was again employed.

The eye was supplied with a large lozenge-shaped pupil, having its longest diagonal placed horizontally, and the obtuse angle at the right. The eye was placed in the dark chamber on a support which enabled it to be examined freely on all sides on its axis. At a distance of 2 metres from the cornea, a lighted candle was placed (1).

Placing the ground glass which represents the retina at different distances from the posterior surface of the lens, the refraction was calculated corresponding to each distance and the form, dimensions and arrangement of the field of illumination on the retina in relation to the pupil was recorded for each. The following results were obtained :

(1) The distance of 2 metres was chosen because in reality it is at this distance that the luminous source appears in the usual form of practical skiascopy.

KÜHNE'S SCHEMATIC EYE.

Candle flame (height 4 centim., width 1 cm.) at 2 m. from the cornea. Lozenge-shaped pupil; horizontal diagonal 6 cm.; vertical diagonal 4 cm. Obtuse angle (115°) at the right; acute (45°) at the left (in relation to the eye).

Distance from the summit of the cornea to the retinal diaphragm.	Corresponding refraction in dioptres.	Form, dimensions and disposition of the luminous field on the retina.
Cm. 11	H. + 8 D.	Similar to the pupil: obtuse angle at the right, acute at the left. Horizontal diagonal 39 mm., vertical 26. Slight luminous intensity.
Cm. 13.5	H. + 4.50 D.	Similar to the pupil: obtuse angle at the right, acute at the left. Horiz. diag. 23 mm., vertical 15 mm. Greater luminous intensity.
Cm. 19	E.	Inverted image of the light; quite luminous with circles of diffusion; surrounded by a small, irregular, luminous, pale lozenge with shaded outlines, with obtuse angle at the right and acute at the left.
Cm. 20	M. — 0.50 D.	Sharp, inverted, luminous image of the light surrounded by a small, irregular, luminous, pale lozenge with shaded outlines, with acute angle at the right, obtuse at the left.
Cm. 24.7	M. — 1 D.	Inverted image of the light; larger than the preceding but less luminous; diffuse borders; surrounded by a small, irregular lozenge similar in form to the pupil, with acute angle at the right, obtuse at the left.
Cm. 24.7	M. — 3.25 D.	Similar to the pupil; acute angle at right, obtuse at left. Vert. diag. 21 mm., horiz. 32 mm. Moderate luminous intensity.
in. 27	M. — 4.	Similar to the pupil; acute angle at right, obtuse at left. Vert. diag. 27 mm., horiz., 40 mm. Weak luminous intensity.
Cm. 31.3	M. — 5 D.	Equal to the pupil in form and size. Acute angle at the right, obtuse at left; faint.
Cm. 42	M. — 8 D.	Form of the pupil and double its size; acute angle at right, obtuse at left. Very faint.

Several black cards were made having an opening of the form, dimensions and also disposition of the field of illumination for each distance. The eye was so placed that daylight could be projected from behind with a plane mirror, and at each displacement of the ground glass a corresponding diaphragm was put in place, so as to limit exactly on the retina the field of illumination proper to that distance.

On examining the eye under these conditions, maintaining the distance of 2 metres of the cornea, it was found that when the field of illumination was well centred on the geometrical axis of the schematic eye and the visual axis of the observer's eye, the entire pupil was evenly illuminated. On displacing the field of illumination to the side, a shadow was obtained, the form of which was always that of the side of the pupil where it appeared, in direct or inverse sense, according to the condition of the refraction of the eye.

In order to obtain variations of luminous intensity in harmony with the different degrees of ametropia, a more or less intense light according to the case was projected on the field of illumination by employing, for the more extensive fields of high degrees of ametropia, a white card which reflected a relatively small quantity of light, and for the lesser degrees a plane mirror was employed, and for the neutral point or points near this where the field was reduced to an intense image of the luminous source, direct sunlight from a heliostat was used.

Placing a photographic apparatus on the axis of the schematic eye so as to obtain an image of half the natural size, and arranging it so that it would focus exactly on the pupillary plane of the eye, all the changes of the shadow in relation to the different refractive conditions were fixed. In the case where it was necessary to place the apparatus nearer the schematic eye than the observer's eye, the distance of the ground glass was not quite conformable with the calculations, in order that it might be possible to illuminate the entire pupillary field in a similar way as the corresponding field of illumination, but this was of no consequence in the results sought. After study

ing the point where the field of illumination corresponded exactly with the pupil, this field was displaced laterally, thus producing a shadow, and a photograph of it was made.

Figures 5 and 6 were made from two of these photographs. Figure 5 represents the shadow in a hypermetropic eye when the field of illumination is displaced from right to left in the

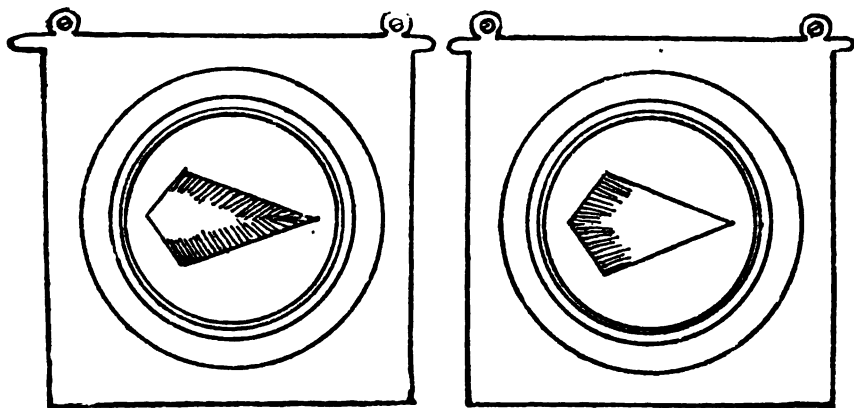


Fig. 5.

Fig. 6.

observed eye, which corresponds to a movement of the mirror from right to left of the observer. Figure 6 represents a hypermetropic eye when the displacement is made in the opposite direction to the preceding. The contrary takes place in myopia.

By the same process records were obtained of the phenomena at the neutral point. Arranging the ground glass, which represents the retina in the conditions of a myopia of 1 D, limiting on it the field of illumination by an opening in the form of a small inverted flame, and taking a station 1 metre in front of the schematic eye, whatever displacement is given to the light, the pupil is always seen fully illuminated without trace of a shadow, and when the light leaves the field of examination, the pupil immediately becomes obscure. If the same arrangements are kept and one stations himself at a greater distance, the phenomena of the neutral point are no longer seen. On displacing the flame a shadow is not formed, but the

tions of the fundus of the eye, according to the different degrees of ametropia.

It is very easy to give an experimental demonstration of this fact.

A small disc of white paper is placed on a black surface (2 millimetres in diameter) and is observed with a lens of high magnifying power at a distance of from 60 to 70 centimetres. When the focus of the lens coincides with the point observed, the dark portion surrounding it is no longer seen; but if the dark surface on which the white disc is placed is displaced to the right or to the left, it will be seen that the field of examination is invaded by a dark portion which has a curve of large radius. By bringing the lens nearer the white disc or carrying it farther away, it will be seen that the white portion is separated from the dark portion by a curve of short radius.

The field of illumination and the shadow which limits it are displaced the more slowly as the ametropia is of higher degree, and for the following reason: the field of examination, independently of the diameter of the pupil and the difference between the observer and the observed, varies with the error of refraction of the observed eye; that is to say, the greater the error of refraction the greater is the extent of the field of examination. We know also that the enlargement of the parts of the retina given by the dioptric media of the eye is very great in an emmetropic eye and in low degrees of ametropia, and that it diminishes as the error of refraction increases.

By applying these facts to the more general case, we may conclude that through pupillary openings of the same size we will have a field of observation sometimes very small (yet enlarged: emmetropia and low degrees of ametropia), sometimes still larger (slightly magnified: high degrees of ametropia). It is quite evident that the shadow will take a longer time to traverse a larger field than a smaller one, and its progress in first case will appear slower.

Luminous Intensity of the Pupillary Reflex.—Apart from the variations which this reflex undergoes in each case on account of the luminous intensity of the source, the more or less considerable refraction of the mirror and the diameter of the pupil, its luminous intensity varies especially with the condition of refraction of the observed eye. In his book, *Instructions pour l'emploi de l'ophtalmoscope*, Bjerrum says:

“If the retinal image of the flame is very diffuse—that is to say, if the circles of diffusion are very great in proportion to the visual angle of the luminous image of the mirror (if their diameter is greater than the extent of the retina of the observed eye in relation to this angle), the retinal image of the light will be more dimly illuminated in its entire extent. The relation is the same as if the luminous source were a point, and the retinal image of a point is the more dimly illuminated according as it is less sharp—that is to say, in proportion as the circle of diffusion which represents it is the greater.”

This is the same explanation that Bjerrum, Chouet, Zieminski, Leroy, Parent, Fick, Bitzos, etc., give of the greater or less brilliancy of the pupil in the different errors of refraction (hence the greater or less intensity of the shadow).

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"It is a bistoury fixed to a handle, with a very thin blade pointed at the extremity, sharp on one side, blunt on the other, and curved on the flat. He claims that on account of this curvature an instrument is necessary for each eye." (Remarks, p. 344.)

By the side of La Faye's knife we see the illustration of that of Poyet, Surgical Interne of the Hôtel Dieu at Paris, "composed of a blade in the form of a serpent's tongue, about two inches long, sharp on both sides for half its length, and pierced at a short distance from the point by an opening to receive a thread." A glance at the illustration shows that Poyet's knife is of exactly the same width as the so-called linear knife of von Græfe.

The knife which was the most employed during the first century of extraction was that of Baron de Wenzel, Sr., introduced into Germany by Richter. Dr. de Wenzel, Jr., gives us the following description of it (1):

Although the success of surgical operations depends far more on the skill of the operator than on the form of the instruments employed, the latter, nevertheless, contribute to it and merit special consideration in the history of surgical manipulation. We observe, as a rule, that the more simple the instruments are, the more advantageous are they in practice.

It is quite surprising that surgeons have been so slow in attaining this simplicity in the instruments employed in cataract extraction. I feel assured that no such imputation should be made in regard to that devised by my father, and which he employed successfully for more than thirty-five years. *Dr. Richter* alone has described it in his *Dissertation*, published in 1770, from knives which he procured at an instrument maker's in London. But since it is natural that the inventor should know his instrument better than he who has only copied it, and since greater accuracies should be expected from him than from his imitators, I will give a detailed description of it, in which I shall have occasion to point out several errors which have crept into the description given by the physician of Gottingen. This instrument, which should be called a *cératotome* rather than an *ophthalmotome*, because it is intended to cut the transparent cornea,

(1) *Traité de la cataracte, Paris, Duplaix, 1786, p. 47.*

resembles a lance for blood letting, but its blade is not quite as broad, and is slightly longer ; it is straight, and if at times it has an almost imperceptible convexity, that is solely the fault of the workman ; its convexity is too great in the illustration given by Richter. The blade is eighteen lines in length and three in width at its broadest part ; as it decreases from the base to the point, it is only in the part about four lines from the base that it is three lines in width, but about six lines from the point, and near the outer third, it is only a line and a half in width.

I think that a very correct idea of de Wenzel's knife may be given by saying that its blade has the shape of a bamboo leaf, or of a very narrow reed grass. But it has several peculiarities devised by a skilful operator and excellent observer with a large experience, peculiarities which perhaps merit renewed attention since the renewal of simple extraction :

To perfectly understand the form and utility of this instrument, the two borders or sides should be described with even greater care than its length and breadth, since they have an important influence in operating. One of the sides of the blade, which I shall call the inferior (because it is ordinarily situated below in the operation), is sharp in its entire length. Three lines from the base of the blade, this border has a slight projection, so that the blade is slightly more enlarged on its inferior border than on its superior border, which is almost entirely straight. This very slight projection of the inferior sharp border of the blade is sufficient to favor the section of the cornea, which is ordinarily made by a single introduction of the instrument, and without special movements, as I shall show later. The superior border is divided into three portions. From the base toward the point for about ten lines on the blade, the border presents a blunt, slightly flattened surface. The following portion, which is about six and a half lines in length, is blunt and rounded. This second portion looks as if it were sharp, because the blade is very thin at this part. Finally, the extremity of this superior border for the distance of a line and a half is sharp like the inferior border, in order to facilitate the entrance and exit of the instrument through the cornea.

In the following portions of the description Dr. de Wenzel

gives several details of fabrication and describes the most frequent defects in the instruments made at London, a defective example of which led to Dr. Richter's errors. De Wenzel strongly defends his instrument and repeatedly protests against the usurpation committed by Richter, both as to the fact and the manner of it.

Dr. Richter, while travelling, stopped in London, and received from an instrument maker named Savigny, and who works for me, a dozen instruments which were intended for me. On his return to Gottingen, after an interval of only a few months from his arrival, he published a small pamphlet in which he presented our instrument to the public, and seemed to claim its invention, although my father had been using it for more than twenty years before.

And in a note :

"I am well assured that Dr. Richter describes this instrument as his own, since he frequently employs the expression *cultellus noster*, *cultellus quo utor*, without mentioning my father." (L. c. p. 32.)

Among Daviel's contemporaries Garangeot alone seems to have employed the bent needle and scissors for incision of the cornea; the others employed one of the knives described. Until 1762, as we have seen, section was situated in the limbus and ordinarily included half or more of the corneal circumference. After 1762, without doubt as the result of Daviel's last Memoir and under his personal influence, we see the principal operators change the situation of the section, which from the limbus passed into the transparent portions of the cornea, being placed at a short and equal distance from the limbus and including a little more than half the height of the cornea. This was the only possible solution for those who decided to perform keratotomy with a single instrument and retain the last recommendations of Daviel. By placing the section in the transparent part of the cornea, it was supposed that prolapsus of the iris would be avoided or diminished. Several operators made the flap situated obliquely outward in order to simulate as far as possible Daviel's triangular flap with nasal base. Dr. de Wenzel, Jr., in his treatise on cataract gives illustra-

tions which show that the section of de Wenzel, Sr., was lateral, semicircular, slightly within the limbus, and situated either on the nasal side and a little above, or on the temporal side and a little below. Demours (*Traité*, Vol. I., p. 509) says in regard to this incision :

My colleague Dr. de Wenzel has described the method of his distinguished father, which consists in making the incision obliquely by entering a little above the external extremity of the horizontal diameter of the cornea and coming out a little below the internal extremity of this same diameter. It is very true, as Dr. de Wenzel says (1), that the cicatrix from an incision thus directed is very easily formed.

As a fact de Wenzel's description accords with his illustrations and contradicts the statement of Demours :

Then the operator introduces the instrument into the upper and slightly external portion of the cornea at a quarter of a line from the sclera. It is brought out in the lower portion of the cornea a little to the side of the internal angle at the same distance from the sclera as where it pierced the cornea above.

It should be mentioned in passing that de Wenzel operated without blepharostat and without ophthalmostat, opening the lens with his *cératotome* in passing, and thus employing one instrument. Demours (2) employed in addition to a *cératotome* similar to that of de Wenzel a cystotome, that of la Faye, and operated without fixation, making a flap of semicircular form in the cornea a third of a line distant from the sclera. His incision was directed below and slightly outward. Roux, a surgeon at la Charité, performed a similar section from 1820 to 1830, having a medium obliquity midway between the almost lateral incision of de Wenzel and the almost inferior incision of Demours.

Holding Richter's triangular knife (*sic*) in the other hand, the point

(1) WENZEL.—*Traité de la cataracte*, p. 78.

(2) DEMOURS.—*Traité*, Vol. I., p. 508.

is inserted in the border of the cornea at a large angle and at a short distance from the junction with the sclera. Professor Roux always makes this puncture well above the external extremity of the transverse diameter of the eye, but the height varies. When the eye is favorably disposed, the incision is as much external as inferior, so that in this regard de Wenzel's rule is exactly followed.

When the cornea has been pierced the blade of the instrument is pushed parallel to the iris until the point comes out at a position almost diametrically opposite that at which it entered. However, this second puncture is almost always so situated that when the section is completed it includes a little more than half the circumference of the cornea; to say that it should be seven-twelfths rather than nine-sixteenths is impossible, and as the difference between these fractions is only a forty-eighth, there is . . . Furthermore, as soon as the point of the knife escapes at the internal angle of the eye, the fingers of the assistant and the operator should cease applying the slightest pressure to the organ, and the section is completed by continuing to push the blade parallel to the iris, and in the same direction, but without ever pressing directly from above downward. (1)

I cannot better complete the history of cataract extraction during the first century which followed its invention than by quoting Desmarres, who among modern physicians has contributed most to the perfecting of ocular operative methods, especially those for cataract and iridectomy. He invariably makes his flap upward by means of a semicircular section about 1 millimetre from the sclero-corneal junction. He fixes the lids and the eyeballs. His exposition at the same time describes the procedures antecedent to de Wenzel and renders justice to operators whom I have failed to mention.

Richter was the first to suggest the idea of cataract extraction by incision of the upper part of the cornea; but the practical application of this method on the living subject is due to Busnau (Tournay) and to Wenzel, Sr. Later Santarelli described this operation, which he soon rejected and which at the present time almost all surgeons, following the example of Jaeger, perform to the exclusion of other

(1) THEODORE MAUNOIR.—*Essai sur quelques points de l'histoire de la cataracte*. Paris, 1833, p. 58.

methods of keratotomy. It is the latter who has most largely contributed to its introduction and establishment as a prevailing method.

Desmarres (1) adds to this a modification taken from Alexandre and Guthrie :

This method rests entirely on the preservation of a small bridge of the cornea, which is divided after incision of the capsule. The operator leaves a fairly large bridge between the puncture and the counter puncture, then the knife is withdrawn and replaced by a bent needle, with which the capsule is opened. The needle is in its turn withdrawn and replaced by a blunt keratome in the form of a small knife, by means of which the section of the cornea is completed.

These facts may be summarized in the following manner :

Daviel at first made an inferior section including two-thirds of the cornea (1745 to 1751). He reduced the size of this section to half the cornea in the period which elapsed between his communication to the Academy of Sciences (1750 or 1751) and that to the Academy of Surgery in November, 1752, and then made an inferior semicircular flap with section situated in the limbus. During the two years preceding his death, he made a lateral triangular flap with nasal base situated entirely in the cornea. His contemporaries and successors, while conceding the reason which led Daviel to place his section in the transparent portion of the cornea, made a semi-circular flap, the borders of which were three-fourths of a millimeter within the sclero-corneal junction and parallel to it, but performed their keratotomy with a single instrument, the knife. The direction of this flap is sometimes lateral and inclined slightly downward (de Wenzel), sometimes almost inferior (Desmours), at other times oblique (Roux), and becoming superior under the influence of Richter and Desmarres. But whatever the direction of the flap, the section always remained in the cornea at a distance from the limbus which varied from 0.75 to 1 millimeter.

(1) DESMARRES.—*Traité*, III., p. 186.

PARTIAL RETURN TO DEPRESSION.

Daviel's communications to the Academy of Sciences and to the Academy of Surgery in 1750 and in 1752 received widespread notoriety. At Paris the victory for extraction was a triumph. It is worthy of mention that the only one of its distinguished defenders whose name was not attached to some instrument designed to improve upon the operation as devised by Daviel was the great surgeon Tenon, who, in 1757, published his "*Thèse sur la Cataracte.*" Richter's dissertation "*De Cataractæ Extractione,*" Gottingen, 1770, established extraction permanently in Germany. Jean-Pierre Maunoir spread it abroad in Switzerland and in Scotland, as much by the example of his successes as by his writings. In England extraction found in Sharp and in Adams advocates as earnest as they were authoritative. Gerard Tenhaaff introduced this method in 1761 into the Netherlands, where he had employed it since Daviel's first communication. Casa-Amata was its promulgator in Italy. If depression still continued to be performed by many operators but little inclined toward innovations, it was, so to speak, clandestinely done for the first forty years which followed the invention of extraction. Even Palucci, that great official master of depression, found the road to Damascus as soon as Daviel's discovery received such great notoriety, and the authors of this period unhesitatingly proclaim the superiority of extraction.

This relation between the two operative methods changed completely at the beginning of the present century, when two men who exercised a great influence on their contemporaries declared themselves partisans of depression. I refer to Dupuytren and Scarpa. It should, however, be said that these two celebrated surgeons were not in the same degree favorable to depression. Dupuytren performed this operation rather from taste and routine than from conviction, without attributing to it superior merits over extraction and without teaching his pupils one method in preference to the other.

“Dr. Dupuytren prefers depression to extraction. He rarely has recourse to this latter method, and then only in certain special cases where it is manifestly indicated, as for example, when the lens or its membrane has undergone such an alteration in its nature that absorption is impossible. Discission is only a modification of depression. This method consists of dividing the lens by introducing a needle into its central portion, destroying its capsule, and dispersing the debris into the aqueous humor.” (Leçons orales de clinique chirurgicale de Dupuytren publiées par de Boismont et Marx, Paris, 1839, T. III., p. 292.)

In the following pages the authors explain that the difficulties encountered under certain circumstances in extraction and the desire to employ a single method are the reasons “why Dr. Dupuytren prefers depression.”

We must not leave Dupuytren without mentioning a real improvement introduced by this great surgeon into ocular operative methods. Instead of having the person to be operated upon seated in a chair opposite the operator, this great surgeon operated upon his patients in bed. Cases of fainting occurring during the operation had suggested this fortunate change.

Scarpa, on the other hand, employed all the force of his intellect and his pen in condemning extraction and those who performed it and in favor of depression, which he claimed had been greatly improved by the invention of keratonyxis. The *Annali universali* (March, 1818) contains several letters from this celebrated surgeon addressed to Professor Jean-Pierre Maunoir (Geneva) “concernante l'opera del signor Adams sulla cataratta e sulla pupilla artificiale.” Sir William Adams, in 1817, had published in the *Edinburgh Medical Journal* an article entitled “Practical Inquiry into the Cause of the Frequent Failure of the Operation of Depression.” The ideas expressed in this article are the same which are now in vogue in regard to the comparative value of extraction and depression. Scarpa responded with a plea rather than a scientific article. He doubted the competence and good faith of Dr. L. Este, an

eye-witness of the failure of some of these operations. But the acme of Scarpa's indignation was reached when Adams furnished proof that keratonyxis had been performed and described by several authors before Scarpa, and lastly by Dupuytren.

Jean-Pierre Maunoir was content with the honor of seeing the letters of the great surgeon of Pavia addressed to him. During his whole career he continued to perform extraction.

Jean-Pierre Demours was the first of the partisans of extraction to be influenced by Scarpa. In justification of depression, he availed himself of the name of the celebrated professor of Pavia, giving at the same time the same reasons used by Dupuytren.

Before the celebrated professor of Pavia had brought the operation by depression to the point of perfection in which we now see it, notably by the construction of his needle, I never depressed a lens without repugnance, and then only in complicated cases, for example, when the patient's nasal canal was obstructed, the lids diseased, or when there were opacities on the cornea. Since the publication of the work with which this great surgeon has enriched the healing art, I find less difficulty in depressing the opaque lens by his method, and I have enlarged the number of cases in which I employ it. I am led to use it when the eyeball is very deeply placed in the orbit, or when the cornea is very small; when the eye has suffered formerly from phlegmasiae or when there is a specific taint or headache, and frequently even from a simple desire on the part of the patient. I have depressed the lens of one eye and extracted the other. I would exhort those who are commencing to perform this operation to make themselves familiar with both methods. But in general, I cannot deny that extraction seems to me to be preferable, and that when there is no special indication for depression, extraction should be performed.

It was Desmarres' influence which led to the definite abandonment of depression, and it was he who prescribed the indications for extraction and discission.

In my opinion, extraction should hold the first place, and it

should be employed as a general method with this reserve, that it cannot be indiscriminately applied to all cases (1).

It was the superiority of the results obtained by extraction which led Desmarres definitely to reject depression. Roux, a contemporary of Dupuytren and surgeon at la Charité, employed extraction almost exclusively in the many operations which he performed both in the city and in his service at the hospital. But in giving his results to Maunoir, his nephew, for publication, he stated expressly that it was not his intention to recommend extraction in preference to depression.

It will be readily understood that with such material one should not think of broaching the question whether one method of operation for cataract is preferable to another, and which should enjoy this prerogative. It is certainly not because this question is idle or because it is insufficiently elucidated by the contradictory assertions of authors, but it is, I think, one of extreme difficulty and possibly even insurmountable, if one desires to compare the intrinsic value of the operations employed under analogous circumstances and with all the perfection of which they are susceptible rather than the talent of the operators (2).

RESULTS OBTAINED FROM CATARACT EXTRACTION DURING THE CENTURY FOLLOWING ITS INVENTION.

Daviel, on November 16, 1752, had performed 206 operations, 182 of which had succeeded. The proportion of failures was then 11%. The de Wenzels and the Demours, while communicating many observations, do not give their total results. We must wait until the year 1830 to find what would now be called statistics.

Daviel had operated right and left, and most frequently in private practice. When operating in hospitals abounding in germs, the results of his operations were less favorable. Of 115 patients operated upon by Roux from 1830 to 1833 at the Charité, 73 recovered good vision. In considering the eyes

(1) DESMARRES.—*Traité*, Vol. II., p. 317.

(2) PH. MAUNOIR.—*Essai sur quelques points de l'histoire de la cataracte*. Paris Thesis, 1833, p. 56.

alone, it is found that of 197 extractions, 97 were successful. Fourteen eyes were destroyed by suppuration, which gives the proportion of 7%, and in nineteen cases there was "an opacity of the cornea so complete that nothing could be distinguished behind it." In thirty cases, failure was the result of secondary cataract, and once only was there complete occlusion of the pupil.

The eighteen remaining cases were divided among patients in whom weakness of vision was independent of the operation but in which the extraction had succeeded, and among partial successes.

Regarding these figures from a modern point of view, we would have 33 failures in 197 operations, which gives the proportion of 16% of failures, less than one-half of which were produced by panophthalmitis, and the others by less intense and less extensive infections.

In the period of seven years from 1815 to 1821 Dupuytren operated upon 201 individuals at the Hôtel Dieu by the method of depression. One hundred and fifty-eight were cured, and forty-three lost their sight. Of eight operations by extraction five were cured, one with deformity of the pupil. The losses were due: one to iritis, one to secondary cataract, and one to unknown cause. The proportion of immediate successes was a little higher for depression than for extraction, but the ultimate results were better by the second method. The number of total losses from panophthalmitis and atrophy of the eyeball was about equal in both methods. This inflammation was at times particularly violent after depression. We find in the *Oral Lessons* the observation of a case of death from meningitis occurring as the result of a depression, by direct propagation of an orbital periostitis following post-operative panophthalmitis. In another case the violence of the suppuration caused rupture of the eyeball.

The idea that suppuration was independent of the method of operation was soon appreciated by comparisons among different operators.

I do not think that loss of the eye from suppuration which occurred in the case of Pierre Marteau, who was operated upon by Dr. La Faye, and of Claude Boucher, operated upon by Dr. Poyet, is an accident which should be attributed to their instruments. This occurred with some of the patients operated upon by Dr. Daviel. Nor do I think that this is peculiar to the operation for cataract by extraction of the lens; I have seen it occur more than once after ordinary depression of a cataract. (*Rapport des opérations de la cataracte par extraction du cristallin, faites devant les commissaires de l'Académie, par M. Poyet, chirurgien, etc., par MM. Morand et Verdier. Mémoires de l'Académie royale de chirurgie, T. II., p. 582.*)

The operations in question were performed June 11, 1753.

Most of the later authors preserve the same silence as to the causes of suppuration. Others attribute the causes to the "génie épidémique," but all agree that we have to deal with an accident independent of the method and procedure of operation. Their conceptions are negative and vague, it is true, but they have the advantage of not being more false than those which prevailed during the years preceding the discovery of the cause of suppuration, and are very positive in attributing the suppuration to the extent of the corneal incision.

GENERAL PRINCIPLES OF THE OPERATION FOR CATARACT BY EXTRACTION DURING THE FIRST CENTURY OF ITS EXISTENCE.

During the dozen years which followed Daviel's operative invention all imaginable operative procedures were in turn tried and for the most part abandoned after a short time, to reappear periodically in a more or less ephemeral manner. Those which remained satisfied the two general laws enunciated unreservedly by all the authors of the period: the incision of the eyeball should be large enough to give ready egress to the lens, and the section should not encroach on the sclera. Daviel, while reducing his section from two-thirds to a little more than half the extent of the cornea, laid especial stress in all his communications on the necessity of a sufficient incision. His contemporaries consider the large incision as preferable.

We think that in general to avoid inflammation the section of the cornea should include, as Dr. Poyet advises, two-thirds of its circumference, so as to facilitate the egress of the lens if it freely presents itself, or readily to rupture the lens membrane if it is too closely held in its capsule. (Report of Morand and Verdier above quoted. *Mémoires de l'Académie de chirurgie*, Vol. II., p. 582.)

De Wenzel considers an insufficient incision as very dangerous (*Traité de la cataracte*, pp. 106, 107), and Demours attributes to it the majority of failures.

Almost all the failures or the accidents which sometimes prolong the operation arise from the fact that the incision is too small. The lens is only expressed by means of repeated pressure, leaving its external layer behind, enlarging the pupil and dragging the iris into the wound, which is still more diminished by the presence of this membrane.

It is my opinion that of twenty eyes lost after cataract operation by extraction, seventeen would see if the incision, properly placed, had been a line greater in length. Whoever makes too small an incision will find it difficult to introduce the cystotome to open and tear the capsule. He will encounter the greatest difficulty in removing the debris left by the lens, and this will be the greater as more difficulty is met with in extracting this body. (Demours, *Traité*, Vol. I., p. 511.)

All authors agree on this point, as well as on the inconveniences of making the incision in the sclera.

All these accidents, which it is almost impossible to avoid, soon led to the complete abandonment of this operation, which, as Chélius says, merits only historical mention.

I have made some researches on the subject of extraction through the sclera, but have abandoned them. It is an unwarrantable operation which does not even deserve the historical mention which Chélius would accord it. (Desmarres, *Traité*, Vol. III., p. 282.)

We will conclude the chapter on scleral extraction by saying that Daviel made his first attempts at extraction through an incision situated in the sclera, but that he soon abandoned this method in favor of the corneal flap.

ABANDONMENT OF THE OPERATION WITH LARGE CORNEAL INCISION
IN FAVOR OF THE SO-CALLED LINEAR SECTION AND THE
OPERATION WITH SMALL FLAP ASSOCIATED WITH
EXCISION OF THE IRIS.

The third volume of the treatise of Desmarres, who devised the operation of extraction by means of a superior semicircular incision, as his favorite operation, appeared in 1858. Certainly no one at that time could have predicted that the large flap was about to be abandoned in favor of the linear section and the small flap, combined with iridectomy. To reach this result it was necessary to burn all that had been worshipped and to worship all that had been burned during the century which had just elapsed.

The principal object sought in reducing the incision or in placing the section in the sclera was to reduce the number of losses from suppuration. It was supposed that a corneal section was more prone to suppuration than a section situated in the sclera, and an incision including half of the cornea was peculiarly predisposed to suppurative loss through its incomplete nutrition. Such were the supposed reasons which led A. von Græfe to create the method of linear extraction. The incision is made with a very narrow knife. After having for some time made his incisions entirely in the sclera at some distance from the cornea, von Græfe settled upon the following method of operation: the knife, the sharp blade being turned upward, is introduced about $1\frac{1}{2}$ millimetres from the border of the sclera, and 2 millimetres below the tangent to the summit of the cornea, so as to penetrate the anterior chamber in its most peripheral portion. By a circular movement the point of the knife having been introduced into the anterior chamber, is carried under the scleral border so as to meet the counter-puncture at a point symmetrical to that of introduction. This counter-puncture is terminated when no more resistance is felt. At that moment the knife is inclined in such a manner that the blade makes an angle of about 20° with the plane of the

iris and so that its back is directed toward the centre of the imaginary sphere of which the cornea is a segment. The section is then terminated by sawing movements so as to make its exterior opening fall entirely within the sclera. We thus obtain a section almost rectilinear and forming a tangent to the circumference of the cornea.

In spite of the theoretical advantages attributed to this section, it gives but difficult egress to the lens. The iris forms an obstruction, and iridectomy is the inevitable condition of evacuating the cortical masses. Nevertheless, it is a long and tedious operation. Contractions of the orbicularis of the lids and of the long muscles frequently cause the vitreous humor to make its appearance in the gaping of the wound, and thus render dangerous the continuation of maneuvers designed to evacuate the cortical masses. To avoid these contractions, Professor Jacobson, the only one who has remained faithful to the strictly linear section, has found himself obliged to chloroform the patients whom he operates upon for extraction of the lens to the fullest extent. How far this is from Daviel's operation, "which lasted scarcely more than two minutes and caused no appreciable pain to the patient" (Thomas Hope's letter).

Most of von Græfe's pupils brought the section near the sclero-corneal junction, and some, Horner among them, made it coincide with the limbus. But all such methods give rise to incisions of insufficient extent, and, in spite of the complication of iridectomy, only permit evacuation of the cortical masses and even of the lens nucleus with difficulty.

In the hope of reducing or avoiding cases of loss from supuration, the majority of operators accepted the combined operation, closing their eyes to its difficulties. Furthermore, the personal influence of von Græfe played a rôle in this revolution as considerable as it was difficult to be arrested.

The first attempts at a scleral incision after its rejection by Daviel go back, as do all the other operative modifications of extraction, to the latter half of the eighteenth century. In his

treatise on cataract, which appeared in 1786, Dr. de Wenzel, Jr., describes an effort of this kind :

Some years ago M. J—— announced a new method which had certainly not been employed by any one before him. He obtained from Dr. Morand, then surgeon in chief of *des Invalides*, permission to perform his operation in the presence of several celebrated surgeons, Drs. Louis Sabatier, etc. He made his first incision in the lower part of the sclera a line from the cornea with an instrument resembling an ace of spades. This incision was large enough to introduce a second instrument in the form of a small snare attached to a handle. M. J—— employed this to fish out the lens, but unfortunately he fished out at the same time too great a quantity of the vitreous. Of the seven patients whom he operated upon at *des Invalides* no one of them recovered sight either on account of inflammation, pain, disorganization of the internal parts of the eye, or because the loss of vitreous had been so great that vision was no longer possible. (*Traité de la cataracte*, p. 33.)

M. J—— is Janin, whom, after attempts similar to those made later by Schuft, Jaeger and von Græfe, we see bringing his section near the cornea and returning to the large corneal incision three years after his trial of peripheral incisions.

Three of the most distinguished masters, Desmarres, von Hasner and Sichel, never ceased to perform and to defend simple extraction with a large incision. A short time after von Græfe's death I saw two of his most ardent pupils perform simple extraction from time to time on the sly, having the apparent feeling of committing a besetting sin. But during the life of the great master such a sacrilege was certainly not perpetrated.

The disadvantages of difficult and incomplete egress of the lens, pointed out by the writers of the first century, have been the inevitable accompaniment of combined extraction. The decrease in the number of cases of suppuration coincident with its introduction should be attributed to other causes than to the diminution in the extent of the incision. With the discovery of the cause of suppuration the new process lost its claim for

existence and it became difficult if not impossible to uphold it by arguments. Since then we see von Græfe's partisans defending combined extraction by means of the publication of the results obtained.

There is nothing more difficult and more delicate to appreciate than the value of "operative statistics" and the arguments they furnish in favor of an operation which they are intended to defend. Most authors have taken the prudent course of preserving silence on this matter. It will be well for us to recall that Dupuytren and Maunoir openly declared that the results obtained by different operators from depression on the one hand and extraction on the other could not be used conclusively in favor of either method. Chavernac aims a direct blow at statistics and their authors :

I do not desire to give statistics, for they have no value except for their author ; he alone knows their faults, their favoring peculiarities, and he alone knows exactly what is their worth. But I may say with all frankness that of all the methods which I have used none has given me such brilliant results in regard to vision as Daviel's method. (*Annales d'Oculistique*, Vol. C.)

If such statistics pretend to prove that linear extraction diminishes the frequency of suppurations as compared with extraction with a large incision they come into contradiction as well with the clinical observations of the first century (Desmarres, *Traité*, Vol. III., p. 282) as with the recent biological discoveries of the cause of suppuration. On the other hand, they show that in a certain number of cases slow and painful irido-choroiditis accompanies an insufficient peripheral incision, that is to say, the linear or combined operation for cataract extraction. This most serious accident is not to be avoided by antiseptics.

We read in a report on two hundred cataract extractions by the combined method, the modified von Græfe method, given by Mme. Kerschbaumer (*Archives of Ophthalmology*, Vol. XX., p. 349):

Asepsis was sought to be established both during and after the operation. Escape of vitreous. This happened thirteen times. Cyclitis. This occurred in twelve cases. Incarceration of the iris. This resulted in thirteen cases.

It is this latter accident, incarceration of the iris, that the partisans of combined extraction bring as a reproach against simple extraction with a large incision. Chavernac (*l. c.*) uses a very picturesque phrase in regard to the disadvantages attributed to simple extraction by the partisans of combined extraction: "When one wishes to kill his neighbor's dog, one says that it is mad." The danger of prolapse of the iris in simple extraction has been and still is exaggerated. In a recent report on one thousand cataract operations by combined extraction performed by H. R. H. Charles, Duke of Bavaria, Dr. Zenker states:

Of the thousand patients only four were operated upon without iridectomy. Simple extraction, under certain circumstances, gives results of great beauty and offering strong temptations to an operator. If, in spite of the great zeal of its partisans, this method has never enjoyed, and probably never will enjoy, general approbation, there should be important reasons opposed to its more general application, and this is, in fact, the case.

In spite of uerine and the most careful watching, practically impossible in a large hospital, the spectre of prolapse of the iris which rises as a menace behind every patient has never been completely banished. (Tausend, Starr operationen. Bericht aus der augenärztlichin Praxis sr. kgl. Hoheit des Herrn Herzogs Dr. Carl in Bayern, von Dr. Heinrich Zenker. Wiesbaden, Bergmann, 1895.)

I pass over the completely gratuitous objection of the difficulty of watching to consider for a moment prolapse of the iris. In order to justify the objections raised on this point by partisans of combined extraction, prolapse of the iris should be more frequent or more dangerous in the simple operation than in the combined operation. The fact that in the former it is more apparent, more extended and more obvious does not imply that it is more frequent or more dangerous than the

slightly apparent prolapse of combined extraction. The figures show that there is little to choose between the two methods in regard to prolapse of the iris. Mme. Kerschbaumer (*l. c.*) had thirteen prolapses in two hundred combined extractions, a few more than Dr. Panas observed in his simple extractions at the Hôtel Dieu. Dr. Knapp, in a recent résumé of 124 cataract operations, gives the proportion of prolapses in combined extraction as 11%, while for simple extraction it is 14%. The decided prolapse of simple extraction may be radically extirpated, especially if one has no fear of narcotising the patients in difficult cases. The entanglement of the iris in the corners of the incision in combined extraction is irremediable and explains some of the cases of late secondary infection following this method. On impartial view of the facts the conclusion is reached that prolapse of the iris furnishes no argument in favor of either of the two methods.

It is from force of circumstances rather than from statistics and arguments that the cataract operation by combined extraction is losing ground more and more in favor of simple extraction with a large incision, the operation of Daviel. To combat it would be to force an open door, and it is especially with historic interest that I have attempted to analyze the fundamental error which presided at its creation, the vain promise given by its rapid growth, and the weak arguments brought forward to arrest its prompt decadence.

The return to simple extraction with a large incision will solve one of the most disputed question of ophthalmology, arising from the rapid extension of von Græfe's method, the question of ripening incomplete cataracts. The difficult egress of the lens through von Græfe's original or modified section, and the retention of a large part of the cortical masses resulting from the difficulty, are circumstances the more compromising for the success of the operation, if part of the cortical masses are transparent. Almost invisible in the aqueous humor, they escape after every displacement of the eye by the operator who, in order to evacuate them, makes dangerous and frequently

vain maneuvers. Hence the evil reputation of incomplete unripe cataracts and the desire to transform them into complete cataracts, a desire the more justified as some quite advanced incomplete cataracts may remain stationary for a long time. But experience has shown that the various methods of ripening proposed during the last twenty years are frequently inefficient and sometimes dangerous.

Simple extraction allows one to operate upon incomplete cataracts without evil consequences on one condition: that the incision be sufficiently large. *To be sufficient in all cases, it should include half of the corneal circumference.* A smaller incision will not give that easy and almost spontaneous egress to all the cortical masses which is a primary condition to the complete success of the operation. We demand a complete success: the absence of all irritation during recovery, and a dark, round and mobile pupil.

Of the five arguments which Daviel used to prove the superiority of extraction over depression, he gives the first place to the possibility of being able to operate by this method on incomplete cataracts: "In operating by the old method, it is necessary to wait until the cataract is solid, and frequently it does not become so; here the cataract may be extracted as soon as it commences and without waiting for its maturity." (Memoir of 1752, p. 348.)

If to-day the great majority of operators hesitate in fully subscribing to this assertion of Daviel, the reason is found wholly in the insufficient extent of the present incisions. On returning to simple extraction, even the boldest operators have restricted the extent of their incision to less than half of the corneal circumference. But, on reducing his primary incision of two-thirds of the corneal circumference to an incision "but rarely exceeding half of this circumference," Daviel immediately adds that a smaller incision will only give egress to the lens with difficulty, and justifies this assertion by measurements of the diameter of extracted lenses. (Thomas Hope's letters.) Since then smaller incisions have been justified by the dimen-

sions of extracted lenses, but it has been forgotten that the diameter of a cataract should never exceed the size of the section. The question is not to know how much a cataract may be reduced by pressing it through a too narrow opening and thus depriving it of its cortical masses; what is important is to know the dimensions of an incision which will give free issue to every cataract in its entirety. *This purpose will be attained by incising at least half of the circumference of the cornea.*

Far from rendering the operation difficult, a large incision greatly facilitates it. In a certain proportion of cases the lens escapes in its entirety as soon as the section is completed. The introduction of the cystitome and its action, necessary in the cases which form the great majority, are very easy by means of the size of the incision, and for the same reason evacuation of the cataract occurs almost spontaneously and completely. Experience has also taught me that large incisions, properly placed, do not predispose either to loss of the vitreous or to prolapse of the iris.

It was apparently for two reasons that in returning to simple extraction the extent of the incision of the operators of the first century was reduced. The accusation made for twenty years against the large incision, of being the cause of suppuration, had made too great an impression on the minds of all not to have a powerful influence on the size of the section made by those who had the courage to return to simple extraction. Another reason is found in the instrument employed by most of them for making the section. If one attempts to make an incision of the limbus approaching half the corneal circumference with the linear knife, especially the straight model, the aqueous humor escapes completely before the section is completed. The sharp blade of the knife is then in contact with the iris, and the operator is faced with the alternative of injuring this membrane or of making an irregular incision. A return to the large corneal incision of the first century implies a return to the old instruments. Comparative trials of the original knife of Berenger, and Beer's modified form of it, have

led me to decide in favor of the latter, which permits of obtaining very regular sections with the minimum effort. It also has the advantage of being found in the trade, while the construction of an instrument from a drawing and a description meets with numberless difficulties. A careful study of Baron de Wenzel's treatise has nevertheless caused me to decide upon another effort of this kind in favor of the knife invented by Dr. de Wenzel, Sr. The illustrations and description which his son has given us are very detailed, and will, I hope, allow the fabrication of this instrument to be resumed. Possibly by some good chance an example of this knife may somewhere be found different in some details from the description given by Richter. For the benefit of those who wish to have instruments constructed according to the description of Dr. de Wenzel, Jr., I will add to the description already given (page 443 and the following) indications also extracted from the *Traité de la cataracte* and following the portion already quoted :

I will give an explanation of the projection of my instrument, which sometimes seems larger than it really is when the instrument maker suddenly contracts the blade from its widest portion to the base. As the entire blade is not used in the operation, and as for larger corneas but ten to twelve lines at the most are used (if one has carefully measured the width of the blade on the cornea as I shall show in the proper place), the part of the blade nearest the handle is of slight importance, and the instrument maker, in giving greater or less width to the part near the handle, brings forward to a greater or less extent the enlarged portion of the instrument. Such were without doubt several of the instruments which Dr. Richter procured at the instrument maker's in London, as I suspect from the drawing which he has made of them still more than from the illustration which he prepared showing the instrument introduced into the cornea, where it is quite similar to mine, while that which is isolated has a considerable convexity. The blade presents in the middle of its flat surface an enlargement in its thickness ; this enlargement is of no other use than to give greater strength to the instrument so that it will not bend. It is then quite out of place for Dr. Richter, in speaking of this thickened portion of the blade, to assure us that

it is for the purpose of keeping the instrument away from the iris so as not to injure this membrane. When one is familiar with the operation he will perceive that this enlargement of the blade, far from preventing injury of the iris, rather favors it.

Sometimes difficulty is found in terminating the incision of the cornea properly so that it borders well on the sclera, and one is not constrained to complete the section opposite the pupil. It is best to make a large incision in all cases, but this is not always easy either on account of the size of the cornea or of its flaccidity; for then the blade of the instrument being introduced into the membrane to its widest portion is not sufficient to complete a proper incision. I have observed this in several patients, especially in those who fear the operation and who are likely to act badly during its performance. To avoid this disadvantage one should be provided with blades of different widths and measure them by the eye with the size of the cornea, so that they will be capable of cutting through the entire extent of its diameter and thus make the section as large as it should be.

It is now a century and a half since Daviel created the operation of cataract extraction, and a careful comparative study of the modifications made during that time in his operative procedure seem to indicate the necessity of a return to the method described by the inventor of extraction, replacing his many instruments for keratotomy by a large knife. Cocaine has rendered the employment of fixation instruments for the lids and the eyeball inoffensive, and permits of the operation being performed slowly, step by step. The reasons which induced de Wenzel, Sr., to rupture the capsule of the lens with the keratotome while making his incision, so as to terminate as promptly as possible the manipulations performed on an eyeball not fixed, not immobilised and constantly menacing a muscular contraction which would cause the upper lid to escape from the fingers of the assistant, these reasons disappeared when cocaine came into general use. Thus we arrive at the following principles for the modern cataract operation: Daviel's incision made by means of a broad knife, with fixation of the eyeball and the lids, and the use of the cystitome.

Correspondence in regard to the preceding memoir.

While fully appreciating Dr. Sulzer's interesting and conscientious article I cannot pass over without reply the passage in this article which treats of the extent of the section made by Daviel. Probably during the period of trials which must necessarily have marked the first efforts of his new method of operating for cataract, this illustrious surgeon made sections greater than half of the corneal circumference, but he promptly confined himself to a section the extremities of which did not overstep the horizontal meridian. In support of this I would cite as proof the plates which accompany Daviel's memoir, would call attention to the fact that the first plate to which Dr. Sulzer refers had for its particular purpose the representation of the instruments, the eye being seen obliquely is simply an outline drawing; while on the contrary the second plate, in which the instruments are in turn represented as accessory, shows the eyes very carefully and finely drawn, with the evident intention of representing the different steps of the operation. It is here that the extent which Daviel wished to assign to his section should be sought, and in fact it may be seen that its extremities do not perceptibly overstep the horizontal meridian.

L. DE WECKER.

Reply.

My dear colleague :

If there were nothing more than the illustrations of the second volume of the memoirs of the Royal Academy of Surgery to show that the section made by Daviel from 1745 to 1752 embraced two-thirds of the circumference of the cornea, it would perhaps be rash to make a positive statement to that intent—less rash, however, than to pretend the contrary. But may I call your attention to the documents reproduced in my article. They seem to me to establish indisputably the fact that Daviel's incision included two-thirds of the sclero-corneal junction. "If, after section of the cornea, which should include about two-thirds of its extent, a slight compression. . . ." (*Mem. of the Roy. Acad. of Surg.*, Vol. II., p. 354; these *Annales*, p. 337.)

"He introduces a pair of crooked scissars, enlarges the opening on each side by different snips, always as near as he can to the circumference of the *cornea transparens*, until he has made the opening round two-thirds of the *cornea transparens*."

This last phrase seems to me to be very clear. The same source, the Philosophical Transactions for 1752, informs us that it was after 1752 that Daviel began to diminish his section and rarely exceeded half the circumference of the cornea, at the same time loudly proclaiming that a smaller section would be insufficient.

SULZER.

CLINICAL NOTES

TRAUMATIC HERNIA OF THE ORBITAL LACHRYMAL GLAND (1)

By Dr. **J. Bistis** (Constantinople).

Dr. G. Haltenhoff has published a case of traumatic prolapse of the orbital lachrymal gland (2), and I have had occasion, a short time ago, to observe another example of this rare accident.

Case.—March 13, 1892, Josephine D—, aged one year, was brought to me for consultation. This child had fallen on her face in a road full of stones and the lid was cut near the external orbital border. The wound was on the upper lid of the left eye and it was considerably oedematous and echymotic. The skin was intact only near the internal portion; the remainder was a bleeding surface with an almost triangular flap detached from the external third of the orbital border and turned downward. Through the lips of the wound hung, by a sort of pedicle, an oval gray mass. On raising the lid as much as possible I found that the cornea was intact and that there was no exophthalmus. The gray pendant mass was the orbital lachrymal gland.

I was able to reduce the prolapsed gland by suturing the lid in front of it, and my observation differs in this point from that of Dr. Haltenhoff, who excised the protruding gland. Union took place by first intention, and as a result the child has only a slight prominence in this region, as if the gland had not perfectly resumed its anatomical position.

(1) This observation is mentioned in connection with a case of total extirpation of the lachrymal gland presented before the Imperial Society of Medicine at Constantinople. (Session of June 7, 1895.)

(2) G. Haltenhoff. (*Annales d'Oculistique*, May, 1895, p. 319.)

We know that the orbital gland is divided into lobules separated from each other by connective tissue which is condensed at the surface to form a sort of capsule. This capsule is distinctly limited only on the upper and lateral sides of the gland, and several bundles of fibres leave it to be attached to the orbital periosteum, thus forming a suspensory ligament for the lachrymal gland. At its posterior extremity the gland is scarcely to be differentiated from the fatty tissue which surrounds it.

From anatomical facts it will be seen that the orbital gland is only attached to the periosteum on the supero-external side, the remainder of the organ being almost free and having but weak connective tissue attachments to the fat of the orbit. If we now suppose that the orbito-tarsal fascia be cut and that the ocular region undergo a more or less considerable pressure, as from traumatism, it is easy to understand that the least firmly fixed portion of the contents of the orbital cavity will be expelled outward. In the case which I have described, as well as in similar observations, the special situation of the wound—the external orbital border—favored the egress of the orbital gland, which was only retained as by a pedicle by the suspensory ligament of the lachrymal gland.

Intra-orbital hemorrhage may not, then, be accepted as the sole cause of expulsion of the lachrymal gland, as von Græfe supposes, for in this case no such accident occurred. Nevertheless, hemorrhage also contributes to the escape of the gland, as I have had occasion to observe in a case in which I performed total extirpation of the gland for obstinate and painful lachrymation. After the incision, made in the external third of the orbital border, I endeavored to penetrate to the gland, when an abundant hemorrhage occurred. Compression of the wound with an antiseptic tampon arrested it, but blood filled the orbital cavity, and as a result there was on the one hand a temporary exophthalmus and on the other prolapse of the lachrymal gland through the wound.

II.—REPORTS OF SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of November 14, 1895.

Treatment of Detachment of the Retina.

MR. WRAY thinks that treatment for detachment of the retina should be begun as soon as possible, but that one should not rest inactive even if several years have elapsed since the commencement of the affection. A patient who had had a detachment of the retina since 1885 was examined in January, 1893. There was in the left eye only feeble perception of light, and in the right eye was a large detachment including half the fundus of the eye. As there had been a penetrating wound of the left eye many years before, it was removed. With the right eye movements of the fingers only could be perceived at a distance of about four feet.

April 7 some dark-yellow fluid was evacuated from under the retina by means of a puncture with a Græfe knife (Wolfe-Brailey operation).

The patient was put to bed, atropine instilled, and a very close bandage applied. Injections of pilocarpine were given daily, but on the third day they were stopped, as the medication became intolerant to the patient.

One week later the patient could count fingers at three or four metres. A few days after this a second operation was performed, and vision increased to $\frac{1}{4}$ with good illumination. At present the retina is re-attached, and on examination there is seen to be atrophy of the choroid and of the retina with pigmentation at the seat of the primary detachment.

This case shows that even after seven years operative intervention may be successfully attempted.

The Wolfe-Brailey operation was also successful in a second case.

The counter-indications for the operation are :

1, detachment of the retina in the macular region ; 2, extensive hemorrhages ; 3, hypotonia of — 3.

Mr. Little had also operated upon a patient with total myopic detachment of the retina. The result was perfectly satisfactory, and there had been no recurrence.

With a woman having a retinal detachment in both eyes, the puncture was followed by rest in bed for ten days, and recovery was complete. No recurrence.

Mr. Walker has injected several drops of a physiological solution of chloride of sodium into the vitreous after the puncture. The retina remained in place for sixteen months, but six months later there was a recurrence.

Mr. Lang has observed spontaneous cure in two patients.

Mr. Tweedy has operated on many cases by all the known methods without obtaining a permanent recovery.

Mr. Jessop had seen a case of extensive detachment of the retina recover spontaneously and completely.

Mr. Marshall had seen a case of traumatic detachment in which absolute rest was imposed, and finally the retina was completely re-attached. On leaving the hospital vision had increased to $\frac{1}{16}$.

Exophthalmic Goitre with Ocular Lesions.

MR. JESSOP has observed three cases of exophthalmic goitre accompanied with ocular lesions. The first patient was a married woman, forty years old, with bilateral proptosis. The thyroid gland was not hypertrophied. Partial tarsorrhaphy was performed. Four days later both eyes were ulcerated, and the corneas necrosed, in spite of active treatment. The corneas were reduced to Descemet's membrane. At present there is a staphyloma in both eyes. The second patient, thirty-five years old, had similar lesions. She died from cerebral disturbance.

The third case was that of a woman, twenty-four years old, having considerable proptosis. It was necessary to enucleate the right eye. The left eye was subject to recurrent attacks of superficial keratitis. Consulting the literature, the descriptions of 25 similar cases were found, 7 of which were men and 18 women. Of the 7 men 4 died, and of the 18 women 2 died, and 10 lost both eyes.

Mr. Little has never seen corneal ulceration in the course of exophthalmic goitre.

Mr. Power was obliged to enucleate the eye of a patient having exophthalmic goitre and ocular ulceration.

Mr. Mackenzie Davidson is at present treating a case of exophthalmic goitre in which the superficial layers of the cornea are ulcerated.

Mr. Lang has performed tarsorrhaphy in a case of ulceration of both corneas.

Mr. Taylor thinks that total and not partial tarsorrhaphy should be performed.

Mr. Nettleship has seen five cases of exophthalmic goitre with severe lesions of the cornea.

Foreign Bodies in the Eye with Normal Vision.

MR. MARSHALL enucleated the left eye of a student twenty-four years old on account of an injury acquired during a clinical experiment. Numerous fragments of glass had penetrated both eyes.

The vision of the right eye increased after removing some of them, and an opacity of the lens following a lesion produced by a fragment of glass remained stationary and localized. As the media were clear numerous fragments of glass could be seen in the interior of the eyeball. V = $\frac{1}{4}$ with cyl. — 1 D.

Congenital Small Visual Fields (?).

MR. WORK DODD had seen in a man thirty-nine years old, having a visual acuity of $\frac{1}{3}$ after correction, a considerable narrowing of the visual fields. The fundus of the eye was normal and there was no alteration in the chromatic sense. No syphilis. He did not smoke and was a member of a temperance society. No nervous trouble.

Aniridia in Two Brothers.

MR. STEPHENSON has seen two brothers with total absence of the iris without other anomaly. No similar lesions could be traced in the parents or in the family. The third child was healthy.

MEDICAL SOCIETY OF THE HOSPITALS

Session of November 29, 1895.

Ocular Disturbances of Hysterical Origin.

DR. H. CLAUDE.—A woman twenty-nine years old with a history of personal and hereditary neuropathy was affected as the result of an apoplectiform attack with right hemiplegia, or rather hemiparesis with incomplete right hemianæsthesia and ocular disturbances in both eyes. There were also hysterical stigmata and hypnotic sleep was readily induced. The motor phenomena rapidly improved, but the hemianæsthesia persisted and the ocular disturbances developed in various ways.

In the right eye there was at first amblyopia, dyschromatopsia and monocular diplopia, which disappeared, but the pupillary reflex to light remained absent.

In the left eye there was at first very marked amblyopia which diminished little by little, but vision remained very feeble. There was also marked pupillary dilatation with loss of reflex to light, and almost complete abolition of the accommodative reflex. The dilatation of the pupil was modified by atropine, eserine, and hypnotic sleep, during which the pupil returned to its normal condition. There was also in the same eye anæsthesia of the bulbar conjunctiva with preservation of the corneal sensitiveness.

Finally it was found that there was concentric narrowing of the visual field in both eyes and left conjugate paralysis for voluntary movements. The fundus of the eye was normal.

All these disturbances were of hysterical nature. Some were of too rapid development to be referred to an organic cause, and others were modified or disappeared momentarily during hypnotic sleep. No lesions could be assigned which would properly explain the symptoms observed.

Any lesions (peripheral neuritis or central alteration) would be too greatly disseminated or too extensive and also too slight to accept their existence. The possibility of a small lesion of the peduncle or the protuberance modified or dissembled by the concomitant hysterical manifestations would still remain for discussion.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX

Session of October 25.

Large Foreign Body in the Eye which was Unnoticed for Three Months and Escaped Spontaneously.

DR. ARMAIGNAC.—On the 4th of last March I saw a young man of sixteen years whose left eye had been injured one month before by the explosion of a Lefauchaux cartridge.

The eye was filled with blood, so that for several days no information could be gained of the condition of the internal portions of the eye, or the possible presence of a foreign body in the orbit.

The redness and blood soon disappeared and the patient recovered, so to speak, without pain or inflammation, but with partial atrophy

and softening of the eyeball. The cornea remained transparent, and a small cut could be seen in the lower part of the iris. The lens was opaque, and completely prevented a view of the deep portions. The eye was neither sensitive, red, nor painful, so that I was compelled to adopt expectant treatment.

This condition persisted until May 26. On that day a swelling which rapidly increased appeared in the lower portion of the small sclero-corneal cicatrix. On May 28 the patient returned to me to show me the foreign body which was coming out of the eye, accompanied by his physician, who asked me to extract it, as he did not wish to do it himself. While the patient was in my reception room, the foreign body came out of the eye spontaneously and fell into his hand. It was a large piece of dark copper wire twelve millimetres long by one and one-half millimetres thick, which was readily recognized: it was part of the Lefaucheur cartridge which had exploded.

Dr Lagrange called attention to the fact that the foreign body was of copper. Objects made of this metal are less damaging to the organ of vision than objects of other metals.

SOCIETY OF GERMAN NATURALISTS AND PHYSICIANS

Vascular Alterations in Syphilitic Affections of the Eye.

DR. ALEXANDER (Aix-la-Chapelle).—Specific alterations in large arteries have been recognized since the seventeenth century by Malpighi and his disciples, while the discovery of syphilitic affections of the small arterial branches, especially in the brain, was made by Heubner in 1874. The well-known relations associating the eye with the brain should induce us to look for specific alterations of the arteries of the eye.

Specific iritis is produced by vascular alterations. As Michel and Fuchs have shown, the walls of the vessels of the iris are in such cases the seat of gummatous degeneration; frequently they are obliterated by proliferation of the endothelium. Syphilitic glaucoma, described by Pflueger, Samelsohn, Meyer, Galezowski, and others, should be attributed to gummatous degeneration of the chorioidal vessels. In specific affections of the retina, the vascular alterations play an important role. But, contrary to Ostwalt, who refers all syphilitic affections of the retina to a gummatous

degeneration of the vessels, and who attributes the probable production of ultimate specific encephalitis to these vascular alterations, I have only been able to trace the influence of the vascular affection in recurrent central syphilitic retinitis, an affection distinguished by its tenacity. Uhthoff has only rarely found alterations in the retinal vessels in persons who have died of specific encephalitis. On the other hand, it is probable that primary gummatous optic neuritis starts with an alteration in the walls of the central vessels, which thence extends to the central fibres of the optic nerve.

Since Wagenmann has shown that section of the ciliary arteries is followed by alterations resembling those found in parenchymatous keratitis of syphilitic origin, it may be considered probable that specific affections of the cornea are linked with an alteration in the vascular system.

Dr. Uhthoff (Marbourg) stated that syphilitic glaucoma, a very rare condition, depended upon an alteration in the retinal vessels. Alterations in the arteries of the choroid and of the retina are rare, and it is an error to attribute to them the specific affections of these membranes.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Archives of Ophthalmology

Reviewed by Dr. SULZER.

VOL. XXIV., No. 3.

I.—**Histology of the Human Macula**, by Dr. G. LINDSAY JOHNSON.

With the aid of carefully collected material, Dr. Johnson resumes the study of the histology of the macular region by means of serial sections of normal eyes of individuals of different ages, ranging from the foetus to old age. The article containing the interesting results of his investigations is illustrated with photomicrographs which completely exclude the subjective factor in representation.

The illustrations show that between the membrana vitrea of the choroid and the hexagonal pigment layer there is a space of variable size, the outer boundary of which is the membrana vitrea, and the inner, also a distinct membrane, which the author proposes

to call the *membrana terminans retinæ*. These two membranes are connected by very minute fibrillæ.

The author thinks that what have until now been taken for the nuclei of hexagonal cells are independent spherical corpuscles (spherules).

These spherules are all of the same size and equidistant; they lie much closer together in the macular region than in any other part of the retina, and nearly touch each other at the fovea centralis, being further apart the nearer they are to the ora serata. This seems to indicate that the spherules play an important part in vision.

The hexagonal pigment layer is formed of two entirely different superposed layers; *the outer or gelatinous layer, and the inner or pigment crystal layer*. The gelatinous layer consists of a gelatinous homogenous stratum limited externally by the *membrana terminans retinæ* and having internally a well-defined boundary parallel to it, and in this layer the spherules lie imbedded at equal distances. Around each spherule spherical pigment granules are imbedded, becoming more numerous the further they are from the spherules. It is this arrangement of the pigment granules which has given rise to the idea of the existence of hexagonal pigment cells, but it has been impossible to discover their septa.

The inner or pigment crystal layer consists of ill-defined irregularly strewn clusters of acicular or oat-shaped pigment crystals, entirely distinct in shape and appearance from the pigment granules of the gelatinous layer, and endowed with freedom of movement and a high refractive power. They lie in clusters in a network—*the pigment crystal plexus*—the meshes of which are of the same shape and size as the hexagons of the gelatinous layer.

The author considers it most probable that the retinal nerve-fibrils terminate inside these spherules.

II.—Congenital Night-Blindness and Pigmentary Degeneration, by Dr. CUTLER.

The material in the clinic of Professor Fuchs in Vienna furnished the author with the opportunity of tracing congenital night-blindness through five generations transmitted through the female line and affecting only males.

These cases showed no visible signs of pigment degeneration and excepting changes due to myopia the ophthalmoscopic image was normal. Of the seven male representatives of the third generation

two were night-blind. A third was amblyopic and myopic ($V = \frac{1}{18}$) but was not night-blind; in the fundus of his eyes were several small spots of choroiditis in different parts but not in the macula.

The condition was stationary in all these cases of hemeralopia, who also presented changes in the peripheral color sense and were amblyopic from birth. The author concludes that there was a congenital hemeralopia independent of retinitis pigmentosa, and that this condition should be classed with hereditary congenital anomalies or malformation. The probable seat of the malformation was in the deep layers of the retina.

III.—Three Unusual Cases of Retino-Choroidal Degeneration, by Dr. CUTLER.

Three sisters, aged twenty-six, twenty-four and twenty-one, having hemeralopia, incomplete cataracts and a peculiar form of choroidal atrophy. The peripheral parts of the choroid are separated by a sharply defined irregular border from a zone of the fundus of normal appearance. The disc is more or less atrophied and is surrounded by a posterior annular staphyloma.

IV.—Improvements for Javal's Ophthalmometer, by Dr. WEILAND.

The writer proposes to replace the circular arc of Javal's instrument by a straight arm divided into unequal degrees. He considers this change as justified by the slight error of Javal's present instrument arising from the absolute measurement of the radius of curvature of the cornea and the variations in this value in different individuals.

V.—How Javal's Keratometer may be Easily Changed into a Good Chromatometer for the Examination of Patients as to Color-Blindness, by Dr. WEILAND.

The telescope of Javal's ophthalmometer contains a double refracting prism and therefore may be transformed into a chromatometer. This is accomplished by placing a tube about $1\frac{1}{2}$ inches in diameter before the objective containing at the head-rest end a Nicol's prism and between this and the objective a quartz plate cut at right angles to its axis and about 5 mm. thick. On looking through the instrument thus arranged, one will see two color-fields of complementary hues partially overlapping each other and showing white at the place where they overlap. If the arc of the Javal be rotated, while the color tube remains in the same position, the colors will change con-

tinually but always remain complementary. A patient with normal color sense will always see two different colors, but if he is color-blind he will find that in a certain position of the arc the two colors appear alike.

VI.—A Case Illustrating the Bad Effects which the Establishment of Menstruation may have upon the Course of Interstitial Keratitis, by Dr. JOHN DUNN.

The writer has observed a case in which the first appearance of menstruation had been marked by an increase in corneal infiltration and disappearance of photophobia.

VII.—A Case of Dermoid Cyst of the Orbit, by Dr. MILLIKIN.

VIII.—Traumatic Paralysis of the Abducens Nerve, by Dr. MOULTON.

IX.—Diplopia Occurring at the Periphery of the Field of Fixation, by Dr. ALLING.

Rotations produced by the internal recti on the one hand and the external recti on the other are unequal and the peripheral parts of the fields of fixation of the two eyes do not coincide. This difference does not exceed 10° and varies in different individuals. The diplopia in the peripheral parts of the field of fixation resulting from this position has been studied by the writer for the purpose of determining what part it plays in the hypothesis of a paralysis of the superior rectus. In this diplopia there is a tilting of the images resulting from a rotation of the eyeball on an antero-posterior axis.

The majority of individuals will not recognize double images in the periphery of the field, but almost every one can be taught to see them. Out of 56 individuals examined for diplopia at the near point, 11 saw double at once in some portions of the periphery of the field. Seven of these saw the double images in the upper portion of the field. Of the 45 remaining, 41 were taught to perceive double images.

X.—A New Method of Tying the Sutures in Advancement of the Ocular Muscles, by Dr. BLACK.

XI.—A Clinical Study of One Hundred and Sixty-seven Cases of Glaucoma Simplex, by Drs. ZENTMAYER and POSEY.

These cases were observed in the services of Drs. Norris and Oliver in Philadelphia, and occurred among 22,680 patients, giving a frequency of .736%. Men were found to be slightly more liable than women (85 to 82, 10,591 of the consultants being males and 12,089

being females). The greatest frequency coincided with the sixtieth year.

Of the diseases acting as predisposing agents, the authors give the first place to rheumatism and influenza. The widespread epidemic of gripe during the past few years has produced a marked increase in the frequency of simple glaucoma in Philadelphia.

The disease is almost without exception binocular when the patients come for consultation, but it is rare that the sight of each eye becomes simultaneously affected. The average interval between the commencement of the subjective symptoms in each eye is twenty months, and the average lapse of time between the commencement of the symptoms and complete blindness is two years, five months and a half. In 36 instances both eyes possessed full visual acuity, in 6 instances one eye possessed full visual acuity and the other was blind, and in 107 instances vision was reduced more than one-half in both eyes. In 32 of the eyes with full visual acuity there were distinct glaucomatous excavations.

After loss of sight, headache was the most prominent symptom. A careful examination of statistics shows that hypermetropia has no influence in the production of simple glaucoma. In 86% of the cases treated eserine gave good results. Of the remaining cases iridectomy gave good results in one out of two cases.

XII.—An Unusual Case of Hyaline Bodies in the Optic Nerve, by Dr. GIFFORD.

The eye observed by Dr. Gifford (in a girl of eleven years) presented, besides the hyaline bodies in the disc of the optic nerve, complete obliteration of the arterial branches going to the upper parts of the retina. There had been slight convergent strabismus of this eye since childhood. The first examination, made two years ago, revealed the hyaline bodies, but at that time the vessels were normal. At present, examination shows the disc and its neighborhood covered with a berry-shaped mass of hyaline bodies. There were opacities in the vitreous and obliteration of several arterial branches. During the two years that the case has been under observation the opacities in the vitreous have cleared up, and it is now possible to see that there is a very small stream of blood in the centre of the white arterial branches.

XIII.—An Orbicularis Pupillary Reaction, by Dr. GIFFORD.

For some years Dr. Gifford has observed a pupillary reaction

which has not before been described, and which he calls the orbicularis pupillary reaction. This consists in a contraction of the pupil which takes place when a forcible effort to close the lids, held open with the fingers or a blepharostat, is made. It is best observed in eyes which do not react to light, blind from an affection of the retina, of the optic nerve, or the brain, for when a person with normal vision is not placed under conditions of special illumination, the contraction of the pupil produced by the incident light is greater than the orbicularis reaction. If, however, an individual is placed in a dark room, allowing sufficient light to enter laterally to observe the pupil, this reaction becomes slightly perceptible to the normal eye. With some individuals, if they simply shut the lids tightly, the pupils, when the lids are opened quickly, are seen to be contracted.

XIV.—Treatment of Syphilitic Affections of the Eye by Mercury, Potassium Iodide and Pilocarpine Combined, by Dr. BURNHAM.

In a case of severe specific iritis, mixed treatment produced no result until it was associated with sub-cutaneous injections of pilocarpine.

IV.—BOOK NOTICES

MEDICAL JOURNALS

A Mydriatic of Very Brief Action, by Dr. GROENOUW.
(*Deutsche medicin. Wochenschrift*, 7 March, 1895.)

The solution experimented with and employed at the ophthalmological clinic at the University of Breslau is composed of the following ingredients :

Ephedrine (chlorohydrate).....	1 gramme
Homatropine (chlorohydrate).....	0.01 “
Distilled water.....	10 “

It is a clear, colorless solution, and when instilled into the human eye it ordinarily produces no disagreeable sensation, but in some cases there is a slight smarting.

The physiological properties of ephedrine have been described in these *Annales* by Dr. de Vries (Vol. CI., p. 182).

Instillation of Dr. Groenouw's solution in the dose of 2 to 3 drops in 100 persons for the purpose of making an ophthalmoscopic examination occasioned the following observations:

Accommodation was not influenced and the near point remained the same. Pupillary dilatation was quite pronounced, but reaction to light was not completely abolished. Dilatation began to appear eight minutes and a half after instillation (extremes, six and thirteen minutes), to reach its maximum in thirty-four minutes (extremes, twenty-three and forty minutes). One hour after instillation (thirty-two and eighty-one minutes) contraction commenced, and four to six hours after instillation the diameter of the pupil had resumed its normal size.

The use of this solution is recommended in all cases where it is desired to obtain complete and brief pupillary dilatation for a careful ophthalmoscopic examination. The mixture of ephedrine and homatropine in the proportion indicated is found in commerce under the name of mydrine (Merk, Darmstadt).—SULZER.

Exophthalmus Due to a Syphiloma of the Pterygo-Palatine Fossa, by Drs. HENNEBERT and COPPEZ, JR. (*Ann. de Dermatol. et de syphil.*, March, 1895.)

Joseph N——, forty years old, a collier, entered the service of Professor Coppez on October 29, 1894. For nine months he had suffered from quite violent pains in the head, in the right temporal region. He had noticed at that time a slight difficulty in nasal respiration on the right side. Three months ago right progressive exophthalmus had made its appearance, and at the same time a considerable swelling in the temporal region began to develop.

Examination of the patient showed the presence of a tumor situated in the temporal fossa, the nasal fossa near the middle turbinated bone, and in the orbit. Examination of the naso-pharyngeal cavity revealed an extensive loss of substance of the posterior border of the turbinated bone. A diagnosis of syphiloma of the pterygo-palatine fossa was then made in spite of the denials of the patient. He was treated with iodide of potassium and intramuscular injections of cyanide of mercury. In six weeks he had received fifteen injections, each containing five milligrammes of the active substance. He left the hospital completely cured. Vision of the right eye, which was only one-third when treatment was commenced, increased to two-thirds.

This interesting case shows that before undertaking such a serious

operation as resection of the superior maxilla, all possible information should be obtained, and a careful examination made not only of the eye and the orbit, but also of all the neighboring cavities.—DE BOURGON.

Treatment of Glaucoma with Eserine, by Dr. COHN.
(*Berliner klin. Wochenschrift*, May 27, 1895.)

During a discussion on the therapeutic value of eserine at one of the sessions of the Medical Society of the District of Breslau, Dr. Cohn described a case of a patient who for fourteen years had successfully combatted attacks of glaucoma by daily instillations of eserine. Several of the members present doubted this action of eserine in glaucoma, and on February 1st the author exhibited the patient to the same society. The omission of an instillation of eserine the day before had produced a characteristic attack of sub-acute glaucoma. Dr. Cohn took the opportunity to describe four other observations where the instillations of eserine, repeated daily for years, had preserved excellent vision and an intact visual field in patients who, without the instillations of this alkaloid, were subject to attacks of glaucoma. In other cases these instillations had for years cured attacks occurring at intervals, during which the patients could dispense with the use of eserine. One of the cases of daily instillations was quite interesting in that every emotion produced an attack of glaucoma. Reading, far from provoking them, caused them to disappear. The author attributes this singular action to the contraction of the pupil which accompanies fixation at a short distance.

It was also Dr. Cohn's experience that pure solutions of eserine do not produce follicular conjunctivitis. Great care as to cleanliness will preserve such solutions pure for a long time. The solutions used were $\frac{1}{100}$.

Iridectomy is only justifiable in cases where the use of myotics will not prevent the development of glaucoma, for its results are inferior to those obtained by myotic treatment. The prognosis of operative results is mediocre in cases where its use is indispensable.—S.

V.—MISCELLANY

CORRESPONDENCE

THE OPERATION FOR GRANULAR ENTROPION.

We have received and hasten to publish the following letter :

PARIS, November 15, 1895.

Honored Colleague :

On reading the account of the transactions of the Ophthalmological Society of Paris on October 8, published in the last number of your journal, I was greatly satisfied to find that Dr. Chevallereux, induced by the same motives as I had been, had for a year adopted an operation which I have long employed in preference to all others for granular entropion.

The operation in question was described by me in a communication to the Medical and Surgical Society of Rio de Janeiro in 1892 (see bulletin of this society, November, 1892), and was the subject of a short article published in your journal in 1893, Vol. CIX., p. 115-116, under the title of Simplification of the Snellen-Streatfield Method. As those who took part in the discussion of this subject at the Ophthalmological Society of Paris did not mention this circumstance, which seems to have escaped their attention, I will be greatly obliged if you will mention the fact in the coming number of your esteemed journal.

Yours very truly,

H. DE GOUVEA.

ITEMS

Faculty of Medicine of Cracow.—Professor Wicherkiewicz (of Posen) has been made *Professeur Ordinaire* of Ophthalmology.

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